



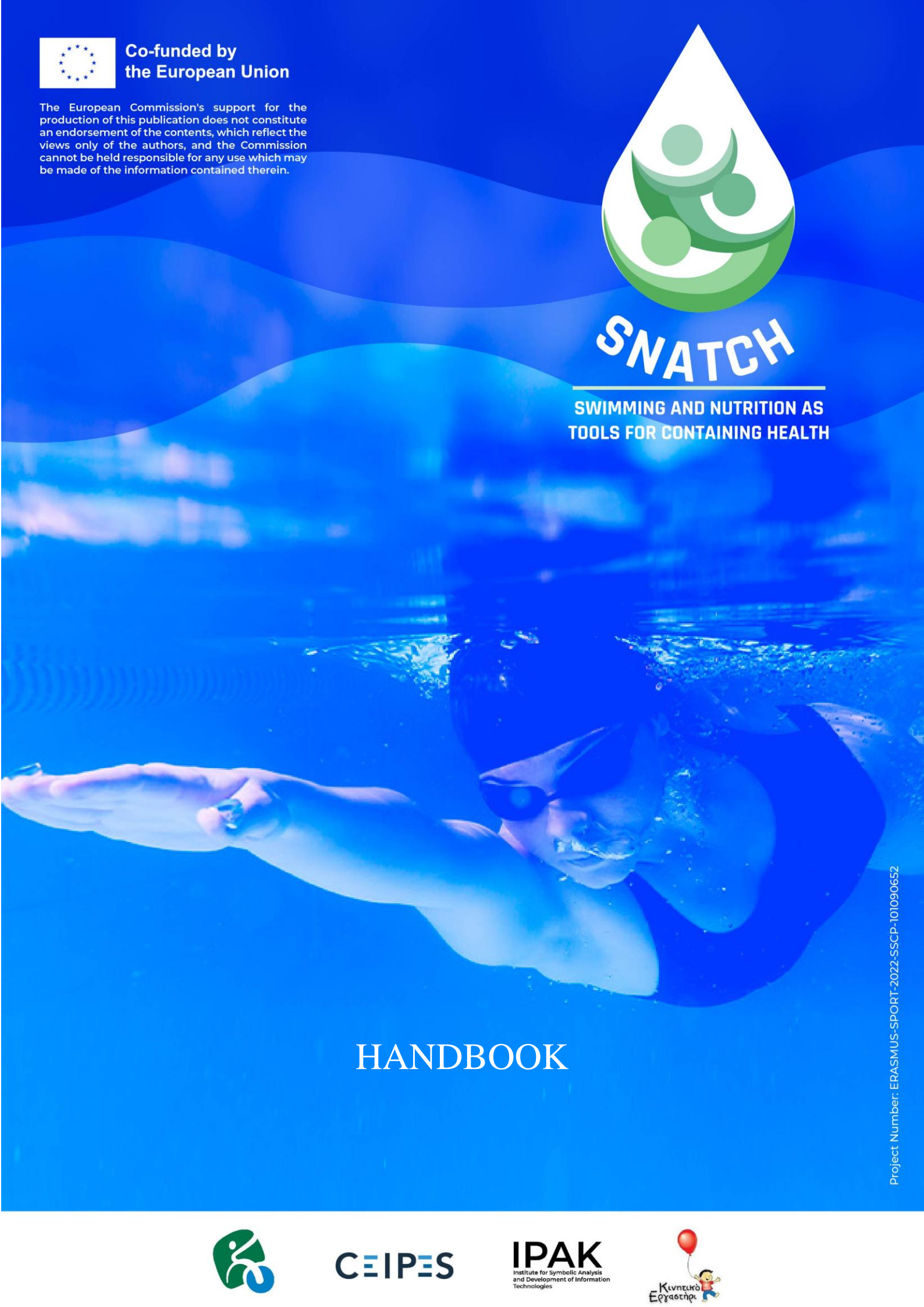
Co-funded by
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SNATCH

SWIMMING AND NUTRITION AS
TOOLS FOR CONTAINING HEALTH



HANDBOOK

Project Number: ERASMUS-SPORT-2022-SSCP-101090652



CEIPES

IPAK
Institute for Symbolic Analysis
and Development of Information
Technologies



The creation of the manual was co-financed by the European Union as part of the Erasmus+ sport program. The content of the manual is the sole responsibility of the Primorje-gorski kotar county disability sports association

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Physical activity

"Physical fitness is not only one of the most important keys to a healthy body, it is the basis of dynamic and creative intellectual activity."

- John F. Kennedy

Definition types of physical activities

Physical activity is any bodily movement that requires energy expenditure. It encompasses a wide range of activities, from leisurely walks to intense exercise sessions. Here are some definitions and types of physical activities:

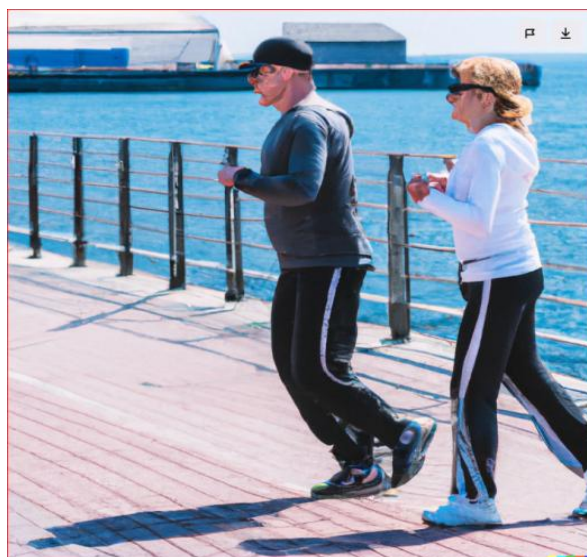
Aerobic Activities

Aerobic activities are activities that increase the heart rate and breathing rate for an extended period. These activities are also known as cardiovascular or endurance activities. Examples include:

- Brisk walking

A brisk walk is about 3 miles an hour, which is faster than a stroll. You can tell you're walking briskly if you can still talk but cannot sing the words to a song.

Figure 1: Brisk walking



Source: Generated by AI DALL.e2

- Running

Running is a method of terrestrial locomotion allowing humans and other animals to move rapidly on foot. Running is a type of gait characterized by an aerial phase in which all feet are above the ground.

Figure 2: Running



Source: <https://www.healthline.com/health/tempo-run>

- Swimming

Swimming is the self-propulsion of a person through water, or other liquid, usually for recreation, sport, exercise, or survival. Locomotion is achieved through coordinated movement of the limbs and the body to achieve hydrodynamic thrust that results in directional motion. Humans can hold their breath underwater and undertake rudimentary locomotive swimming within weeks of birth, as a survival response.

Swimming is a form of physical activity that involves moving through water using various strokes, such as freestyle, breaststroke, backstroke, and butterfly. It can be done as a leisure activity, for competition, or as a form of exercise.

Figure 3: Swimming



Source: <https://blog.myswimpro.com/2016/02/15/how-many-calories-does-swimming-burn/>

Swimming is a low-impact exercise that provides a range of health benefits, including cardiovascular fitness, muscular strength and endurance, and improved flexibility. Because it is a non-weight-bearing exercise, it is also beneficial for people with joint pain or injuries.

Swimming can be done in pools, lakes, oceans, or other bodies of water, and it can be done at any age or fitness level. It's important to swim in a safe environment, such as a designated swimming area with a lifeguard on duty, and to know how to swim and be comfortable in the water before attempting more challenging strokes or activities.

Swimming can also be a social activity and a way to meet new people and participate in swim clubs or teams.

- Cycling

Cycling, also, when on a two-wheeled bicycle, called bicycling or biking, is the use of cycles for transport, recreation, exercise or sport.

Figure 4: Cycling Tour de France 2022



Source: <https://commons.wikimedia.org/w/index.php?curid=120917139> (20.3.2023.)

- Dancing

Dance is an art form consisting of sequences of body movements with aesthetic and often symbolic value, either improvised or purposefully selected.

Figure 5: Dancing



Source: <https://www.flickr.com/photos/93765931@N00/2147032210>

- Jumping rope

Jump rope is a tool used in the sport of skipping/jump rope where one or more participants jump over a rope swung so that it passes under their feet and over their heads.

Figure 6: Jumping rope



Source: <https://commons.wikimedia.org/w/index.php?curid=99590679>

Resistance Training

Resistance training is any activity that uses weights, resistance bands, or body weight to build strength and muscle. Examples include:

- Weightlifting

Weight training is a type of exercise that uses free weights to build strength. Unlike bodyweight exercises which use your own bodyweight to build muscle, weight training exercises use barbells, dumbbells, kettlebells, or weight machines to increase muscular strength throughout the body.

Figure 7: Weightlifting

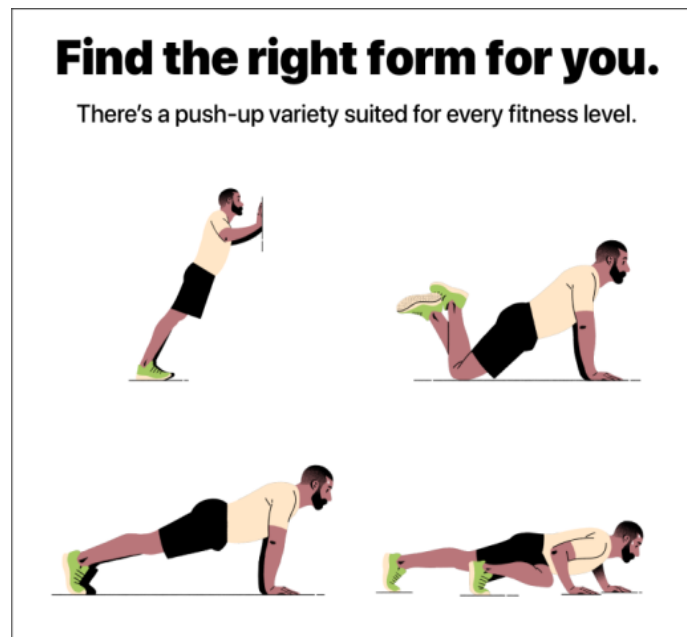


Source: <https://www.sharpmuscle.com/exercises/circuit-training-20-minutes-total-body-circuit-workout-plan/>

- Push-ups

A push-up is a common exercise that targets the muscles in the chest, shoulders, and triceps. It is a bodyweight exercise that involves starting in a plank position, with your arms straight and your hands on the ground shoulder-width apart. You then lower your body by bending your elbows, keeping your back straight and your core engaged, until your chest nearly touches the ground. Then, you push your body back up to the starting position by straightening your arms. This completes one repetition of a push-up. Push-ups can be modified to make them easier or more challenging depending on your fitness level and goals.

Figure 8: Push-ups

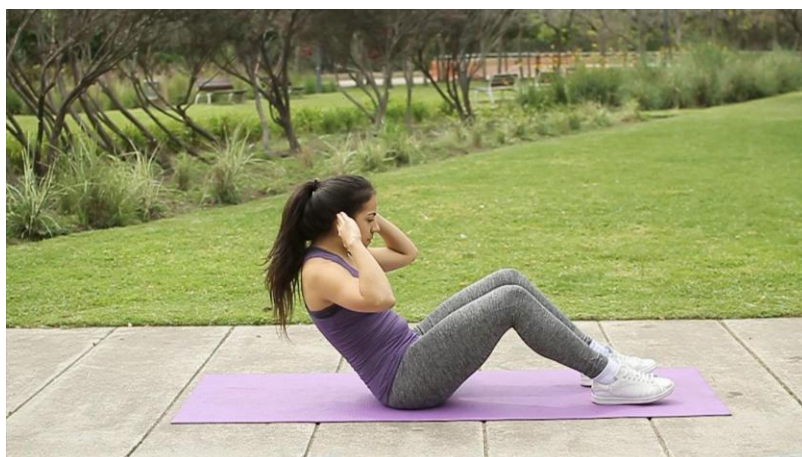


Source: <https://www.mondaycampaigns.org/move-it-monday/find-the-perfect-push-up-for-you>

- Sit-ups

Sit-ups are an exercise that targets the abdominal muscles. They are a bodyweight exercise that involves lying on your back with your knees bent and your feet flat on the ground. You then place your hands behind your head or crossed over your chest and lift your upper body towards your knees by contracting your abdominal muscles. Your lower back and feet remain on the ground. Once you have lifted your body towards your knees, you slowly lower your body back down to the starting position. This completes one repetition of a sit-up. Sit-ups can be modified by placing your feet under a heavy object to make them more challenging or by only lifting your shoulders off the ground instead of your entire upper body to make them easier. It's important to use proper form during sit-ups to avoid strain on the neck or lower back.

Figure 9: Sit-ups



Source: <https://www.wikihow.com/Category:Abdominal-Exercises>

- Squats

Squats are a strength training exercise that target the muscles in the lower body, including the quadriceps, hamstrings, glutes, and calves. They are a bodyweight exercise that can also be performed with added resistance, such as dumbbells, a barbell, or a kettlebell.

To perform a squat, you start by standing with your feet shoulder-width apart and your toes pointing slightly outward. You then lower your body by bending your knees and pushing your hips back as if you were sitting back into a chair. You keep your chest up and your back straight while lowering yourself until your thighs are parallel to the ground or as low as you can comfortably go. You then push through your heels and straighten your legs to stand back up to the starting position. This completes one repetition of a squat.

Squats can be modified by widening or narrowing your stance, changing the angle of your toes, or adding resistance. It's important to use proper form during squats to avoid injury, such as keeping your knees in line with your toes and not letting them collapse inward.

Figure 10: Squats



Source: <https://www.runnersworld.com/training/a32256640/how-to-do-a-squat/>

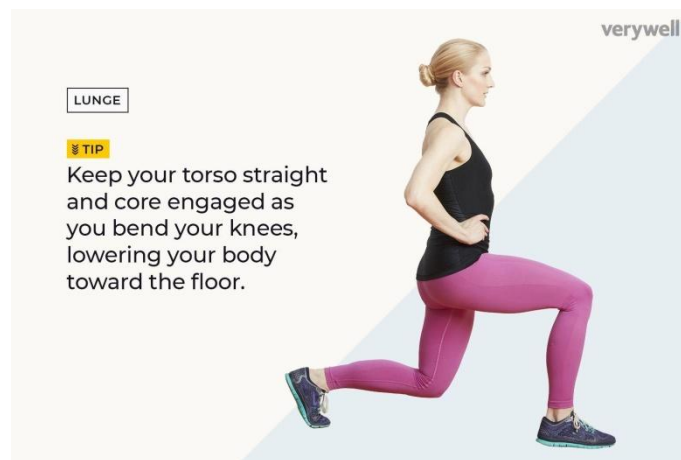
- Lunges

Lunges are a strength training exercise that target the muscles in the lower body, including the quadriceps, hamstrings, glutes, and calves. They are a bodyweight exercise that can also be performed with added resistance, such as dumbbells, a barbell, or a kettlebell.

To perform a lunge, you start by standing with your feet shoulder-width apart and your toes pointing forward. You then take a step forward with one foot, lowering your body by bending both knees until your back knee nearly touches the ground. Your front knee should be directly above your ankle, and your back knee should be hovering just above the ground. You then push through your front heel and straighten both legs to return to the starting position. This completes one repetition of a lunge.

Lunges can also be performed by stepping backward or to the side, and they can be modified by changing the length of your stride or adding resistance. As with any exercise, it's important to use proper form during lunges to avoid injury, such as keeping your knees in line with your toes and not letting them collapse inward.

Figure 11: Lunges



Source: <https://www.verywellfit.com/how-to-lunge-variations-modifications-and-mistakes-1231320>

- Pull-ups

Pull-ups are a strength training exercise that target the muscles in the upper body, including the back, shoulders, and arms. They are a bodyweight exercise that involve hanging from a bar with your palms facing away from you, and then pulling your body up towards the bar until your chin is over the bar. You then lower your body back down to the starting position with control.

To perform a pull-up, you can start by standing underneath a pull-up bar and jumping up to grab the bar with your palms facing away from you, with your hands slightly wider than shoulder-width apart. You then hang from the bar with your arms fully extended, engage your back muscles, and pull your body up towards the bar, leading with your chest and keeping your elbows close to your body. Once your chin is over the bar, you lower your body back down to the starting position with control.

Pull-ups can be challenging, and it may take time to build the strength necessary to perform them. There are also modifications and progressions that can be used, such as assisted pull-ups with a resistance band, negative pull-ups, or chin-ups (where your palms face towards you). As with any exercise, it's important to use proper form during pull-ups to avoid injury and maximize the benefits.

Figure 12: Pull- ups



Source:<https://www.military.com/military-fitness/fitness-test-prep/pullup-push-workout>

Flexibility Activities

Flexibility activities are activities that stretch the muscles and increase range of motion. These activities are also known as stretching or mobility exercises. Examples include Yoga, Pilates, Tai Chi, and other stretching exercises.

Figure 12: Yoga



Source: <https://disabilityhorizons.com/2021/03/leonard-cheshires-workout-package-encourages-people-with-disabilities-to-stay-active-at-home/>

Figure 13: Pilates



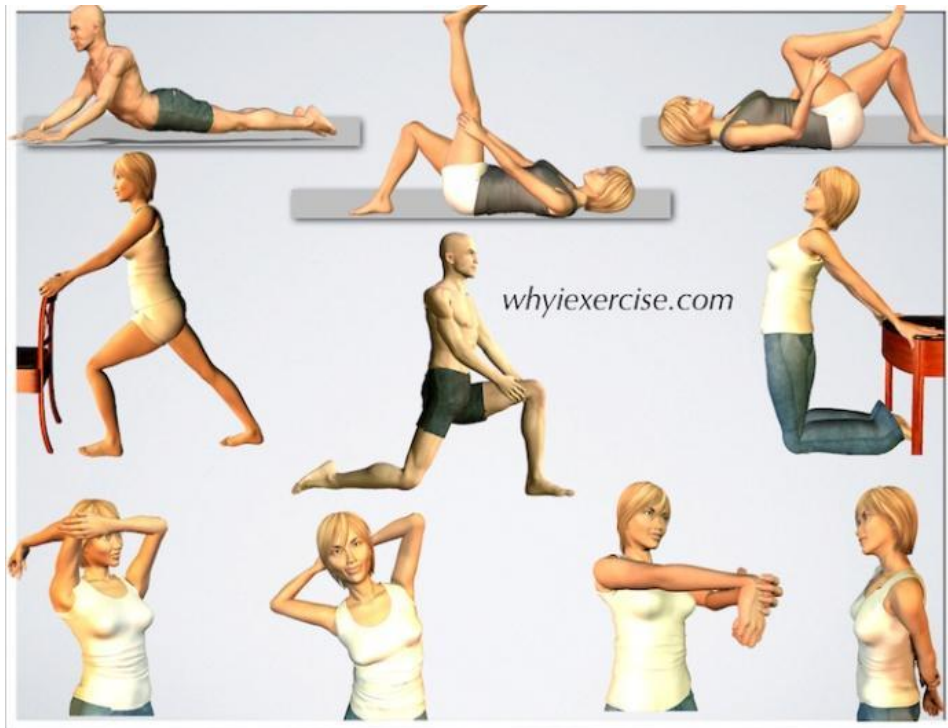
Source: <https://www.palatkapt.com/sportsconditioning>

Figure 14: Tai chi



Source: https://www.youtube.com/watch?v=pa_I5NAOW4k

Figure 15: Stretching exercises



Source: <https://www.whyexercise.com/home-stretching-exercises.html>

High-Intensity Interval Training (HIIT)

HIIT is a type of exercise that alternates between short periods of intense activity and recovery periods. This type of exercise can be done with aerobic or resistance activities.

Examples include:

Sprint intervals

Tabata-style workouts

Circuit training

CrossFit

Outdoor Activities

Outdoor activities are physical activities that are performed outside in natural environments. Examples include:

Hiking

Hiking is a form of outdoor physical activity that involves walking on trails or paths in natural environments such as forests, mountains, or parks. It can be done as a leisure activity, as a way to explore nature, or as a form of exercise.

Hiking can have a range of health benefits, including cardiovascular fitness, muscular endurance, and stress reduction. The uneven terrain and changes in elevation can challenge the muscles in the lower body, while the fresh air and scenery can provide mental and emotional benefits.

Hiking can range from easy walks on flat terrain to more challenging treks on steep and rugged paths. It's important to choose a trail that matches your fitness level and experience, wear appropriate footwear and clothing, bring enough water and snacks, and let someone know where you're going and when you expect to return. It's also important to stay on designated trails and practice Leave No Trace principles to minimize your impact on the environment.

Figure 16: Hiking



Source: <https://commons.wikimedia.org/w/index.php?curid=50096388>

Figure 17: Trail running



Source: <https://www.polar.com/blog/trail-running-preparation/>

Figure 17: Rock climbing



Source: <https://www.csun.edu/as/outdoor-adventures/trips/rock-climbing-trips>

Figure 18: Kayaking



Source: <https://www.cxcoceanexpeditions.com/adventures/kayaking>

Figure 18: Stand-up paddleboarding



Source: <https://www.foodspring.co.uk/magazine/stand-up-paddle-board>

Figure 19: Snowboarding and skiing



Source: <https://www.adventureskischool.com/>

In conclusion, physical activity encompasses a wide range of activities that involve movement and energy expenditure. Engaging in regular physical activity can have numerous health benefits, including improving cardiovascular health, building strength and muscle, increasing flexibility, and reducing the risk of chronic diseases. It is important to choose activities that are enjoyable and appropriate for your fitness level and to incorporate a variety of activities for a well-rounded exercise routine.

Inactivity and its consequences

"The only bad workout is the one that didn't happen."

- Anonymous

Inactivity, or a lack of physical activity, can have negative consequences on both physical and mental health. Here are some of the potential consequences of inactivity:

Cardiovascular Disease

Inactivity increases the risk of developing cardiovascular disease, including heart disease, stroke, and high blood pressure. physical activity helps to improve heart health, lower blood pressure, and reduce cholesterol levels.

Obesity

Inactivity can lead to weight gain and obesity, which is a risk factor for numerous health problems, including diabetes, cardiovascular disease, and certain types of cancer.

Figure 20: Obesity

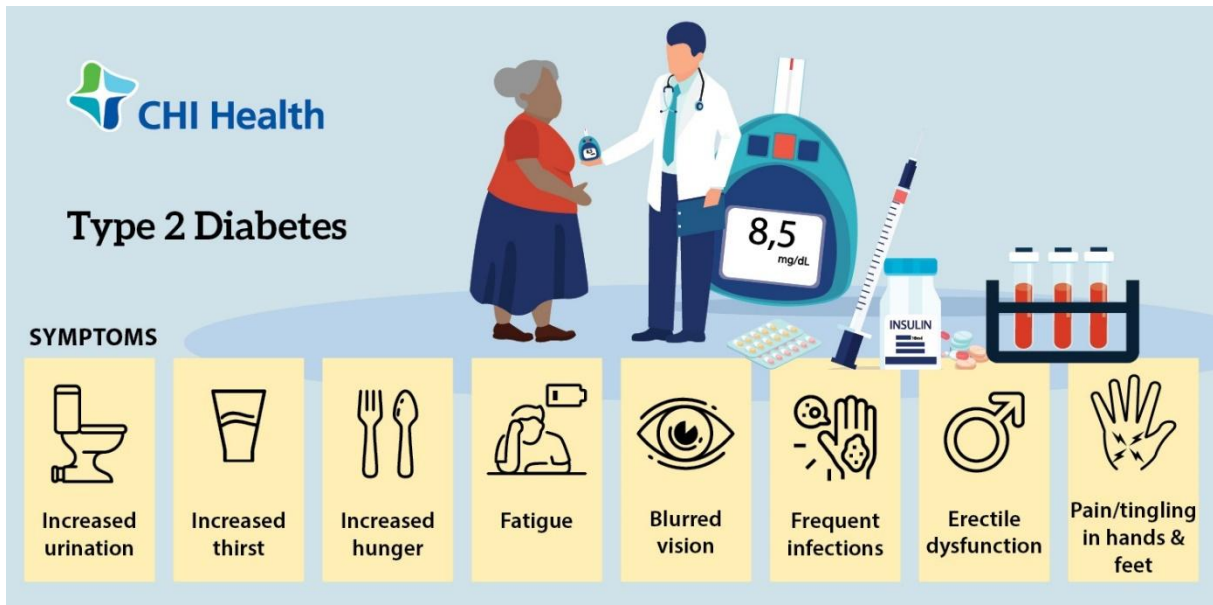


Source: <https://danas.hr/tema/pretilost>

Type 2 Diabetes

Inactivity can lead to insulin resistance and high blood sugar levels, which can lead to the development of type 2 diabetes.

Figure 21: Type 2 diabetes



Source: <https://www.chihealth.com/en/services/primary-care/diabetes/type-2-diabetes.html>

Osteoporosis

Inactivity can lead to a loss of bone density, which can increase the risk of developing osteoporosis and fractures.

Figure 22: Osteoporosis



Source: <https://orthopedicnj.com/news/how-to-prevent-osteoporosis>

Depression and Anxiety

Inactivity can also have negative effects on mental health. It can increase the risk of developing depression and anxiety and can worsen symptoms in people who already have these conditions.

Figure 23:



Source: <https://primebehavioralhealth.com/how-toxic-relationships-affect-your-mental-health/>

Increased Mortality

Inactivity is associated with an increased risk of premature death, even in people who are not overweight or obese.

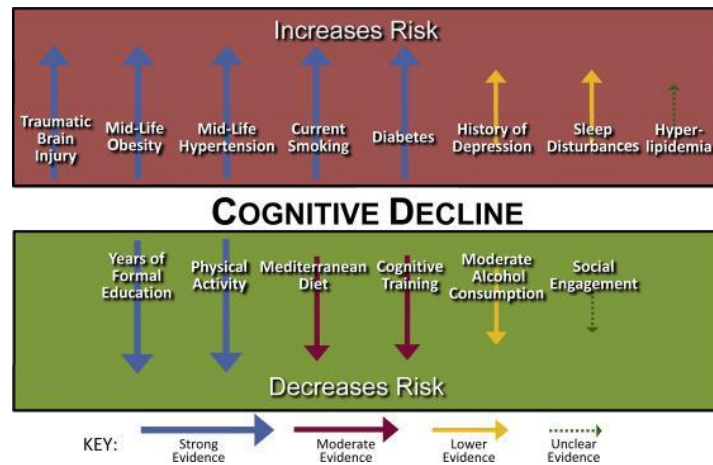
Decreased Cognitive Function

"To keep the body in good health is a duty, otherwise we shall not be able to keep our mind strong and clear."

- Buddha

Inactivity can also have negative effects on cognitive function, including memory and learning. Regular physical activity has been shown to improve cognitive function and reduce the risk of cognitive decline.

Figure 24: Inactivity risks



Source: <https://www.sciencedirect.com/science/article/pii/S1552526015001971>

In conclusion, inactivity can have numerous negative consequences on physical and mental health. It is important to engage in regular physical activity, even if it is just light or moderate exercise, to reduce the risk of these health problems. Additionally, reducing sedentary behaviour, such as sitting for long periods, can also have positive effects on health.

Benefits of physical activity

"A healthy body is a guest-chamber for the soul; a sick body is a prison."

- Francis Bacon

Physical activity provides numerous benefits for both physical and mental health. Here are some of the benefits of physical activity:

Improved Cardiovascular Health

Physical activity can help to improve cardiovascular health by strengthening the heart muscle, lowering blood pressure, and reducing the risk of heart disease and stroke.



Weight Management

Physical activity can help with weight management by burning calories and increasing muscle mass, which can help to improve metabolism and maintain a healthy weight.

Figure 25: Weight management



Source: <https://www.healthhub.sg/a-z/medical-and-care-facilities/53/weight-management-programme>

Stronger Muscles and Bones

Physical activity can help to strengthen muscles and bones, which can reduce the risk of injury and improve overall mobility and quality of life.

Reduced Risk of Chronic Diseases

Physical activity has been shown to reduce the risk of chronic diseases such as diabetes, cancer, and osteoporosis.

Figure 26: Reducing the risk of chronic diseases



Source: <https://euagenda.eu/news/662110>

Improved Mental Health

Mens sana in corpore sano - A healthy mind in a healthy body

- Latin proverb

Physical activity can improve mental health by reducing stress, anxiety, and depression. It can also improve cognitive function, including memory and attention.



Better Sleep

Physical activity can improve sleep quality and help with insomnia by promoting relaxation and reducing stress.

Increased Energy Levels

Physical activity can help to increase energy levels by improving circulation and oxygen delivery to the body, as well as reducing feelings of fatigue.

Social Benefits

Physical activity can also provide social benefits by providing opportunities for social interaction and connection, such as in team sports or group fitness classes.

In conclusion, physical activity provides numerous benefits for physical and mental health. It is important to engage in regular physical activity to reap these benefits and improve overall well-being.

Exercises: How much and what type

"It's not about perfect. It's about effort. And when you bring that effort every single day, that's where transformation happens. That's how change occurs."

- Jillian Michaels

Exercise can be defined as any physical activity that is structured, planned, and performed with the intention of improving or maintaining physical fitness, health, and overall well-being. This can include activities such as aerobic exercise, strength training, flexibility and balance exercises, and mind-body exercises. Exercise can be performed at varying levels of intensity, duration, and frequency, depending on an individual's fitness level, goals, and preferences. The benefits of regular exercise include improved cardiovascular health, weight management, stronger muscles and bones, and improved mental health and cognitive function.

Exercises are an important aspect of maintaining good physical health. Regular exercise has numerous benefits for the body, including improved cardiovascular health, weight management, and stronger muscles and bones. However, many people are unsure of how much exercise they should be doing and what types of exercise are best. In this article, we will discuss how much exercise is recommended and what types of exercises are most beneficial.

How much exercise is recommended?

World Health Organisation launched its Guidelines on Physical Activity and Sedentary Behaviour under the title of "Every Move Counts". The guidelines highlight that any physical activity of any intensity counts and is good for health.

The Guidelines recommend that adults get between 150 to 300 minutes of moderate to vigorous physical activity weekly and that children participate in 60 minutes daily of moderate-to-vigorous physical activity.

How much activity do I need?

Moderate-intensity aerobic activity
Anything that gets your heart beating faster counts.

at least
150
minutes
a week



Muscle-strengthening activity
Do activities that make your muscles work harder than usual.

at least
2
days
a week



AND

Tight on time this week? **Start with just 5 minutes.** It all adds up!

Source: <https://chiropractor-singapore.com.sg/resources/physical-activity-is-not-exercise-being-active-is-not-enough/>

It is important to note that these recommendations are a minimum and that additional exercise can provide even greater health benefits. However, it is also important to listen to your body and not overdo it. If you are new to exercise or have any health concerns, it is important to consult with a healthcare professional before starting a new exercise routine.

What types of exercises are most beneficial?

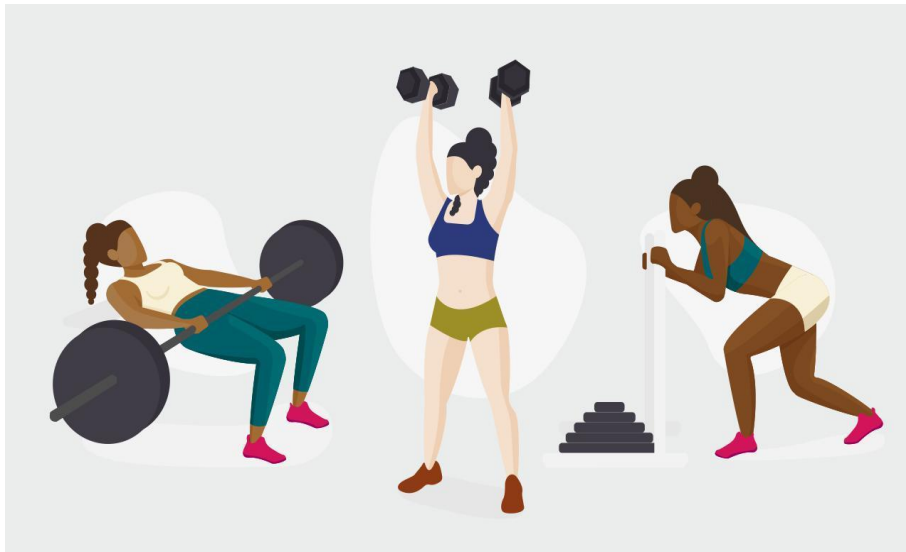
There are several types of exercises that are recommended for overall health and fitness. Here are some of the most beneficial types of exercises:

Aerobic Exercise

Aerobic exercise, also known as cardio, is any activity that increases the heart rate and breathing rate. This can include activities such as brisk walking, running, cycling, hiking, swimming, and dancing.

Aerobic exercise is important for improving cardiovascular health, reducing the risk of chronic diseases, and promoting weight management.

Figure 28: Aerobic exercises



Source: <https://www.istockphoto.com/vector/female-strength-training-athlete-body-builder-character-icon-set-multicultural-gm1195794554-340946166>

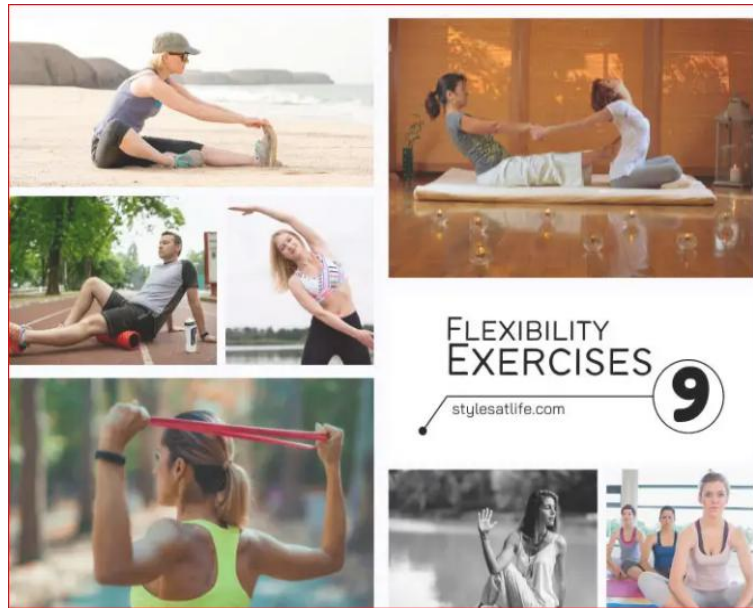
Strength training

Strength training, also known as resistance training, involves using weights or other forms of resistance to strengthen muscles. This can include activities such as lifting weights, using resistance bands, or doing bodyweight exercises such as push-ups and squats. Strength training is important for building and maintaining muscle mass, improving bone health, and reducing the risk of injury.

Flexibility and Balance Exercises

Flexibility and balance exercises are important for maintaining mobility and reducing the risk of falls. This can include activities such as yoga, tai chi, and stretching exercises.

Figure 29: Flexibility exercises



Source: <https://stylesatlife.com/articles/flexibility-exercises/>

High-Intensity Interval Training (HIIT)

High-intensity interval training (HIIT) involves short bursts of intense exercise followed by periods of rest or low-intensity exercise. This type of exercise has been shown to be effective for improving cardiovascular health and promoting weight loss.

Figure 30: HIIT training

Workout Time: 14 Minutes		LEGS	ABS
Equipment: Dumbbells, Jump Rope		SHOULDERS	CARDIO
		BICEPS	
CIRCUIT 1 COMPLETE EACH CIRCUIT 3 TIMES BEFORE MOVING TO THE NEXT CIRCUIT			
:30	ALTERNATING STEP UPS	:30	PLANK TUCKS
:30	REST		
CIRCUIT 2		:30	SHOULDER PRESS
:30	HIGH KNEES	:30	REST
CIRCUIT 3		:30	BICEP CURLS
:30	BICYCLE CRUNCHES	:30	JUMP ROPE

Source: <http://www.teamelitesuccess.com/exercise-advanced.html>

Mind-Body Exercises

Mind-body exercises, such as yoga and meditation, are important for reducing stress and improving mental health. These types of exercises can also improve flexibility, balance, and overall well-being.

In conclusion, regular exercise is important for maintaining good physical and mental health. The WHO recommends at least 150 minutes of moderate-intensity aerobic exercise per week, as well as muscle-strengthening activities at least 2 days per week. There are several types of exercises that are beneficial, including aerobic exercise, strength training, flexibility and balance exercises, HIIT, and mind-body exercises. It is important to find the types of exercises that you enjoy and that fit into your lifestyle to maintain a regular exercise routine.

Exercise and Disease

Exercise is known to have numerous health benefits and can help prevent and manage a range of chronic diseases. Here are some examples of how exercise can benefit various health conditions:

- **Cardiovascular disease**

Regular exercise can help improve cardiovascular health by reducing the risk of developing heart disease, lowering blood pressure, and improving cholesterol levels. It can also help manage existing heart conditions by improving heart function and reducing the risk of complications.

- **Type 2 diabetes**

Exercise can help manage type 2 diabetes by improving insulin sensitivity and blood sugar control. It can also help prevent the development of type 2 diabetes by reducing the risk factors associated with the condition, such as obesity and insulin resistance.

- **Cancer**

Exercise can help reduce the risk of certain types of cancer, such as breast, colon, and lung cancer. It can also help manage cancer-related fatigue, improve quality of life, and reduce the risk of cancer recurrence.

- **Osteoporosis**

Exercise can help improve bone density and reduce the risk of fractures in individuals with osteoporosis. Weight-bearing exercises such as walking, jogging, and strength training can be particularly beneficial.

- **Depression and anxiety**

Exercise has been shown to have a positive impact on mental health, reducing symptoms of depression and anxiety. It can also improve overall well-being and quality of life.

- **Arthritis**

Exercise can help manage arthritis by reducing pain and stiffness, improving joint mobility and flexibility, and strengthening muscles around the affected joints.

- **Chronic obstructive pulmonary disease (COPD)**

Exercise can help improve breathing and reduce shortness of breath in individuals with COPD. It can also improve exercise capacity and overall quality of life.

It is important to note that exercise should always be done in consultation with a healthcare professional, particularly for individuals with pre-existing health conditions. The type, duration, and intensity of exercise should be tailored to an individual's fitness level and health status. However, for most individuals, regular exercise can be a safe and effective way to improve overall health and prevent or manage chronic diseases.

How to motivate people to be physical active

Motivating people to be physically active can be challenging, especially if they are not used to regular exercise or do not enjoy traditional forms of physical activity. However,

there are several strategies that can help encourage and motivate people to be more active:

Figure 31: Motivation to work out



Source: <https://www.verywellfit.com/why-arent-you-motivated-to-exercise-1231389>

- **Set achievable goals**

Help individuals set achievable goals that are specific, measurable, and realistic. This can help them stay motivated and focused on their progress.

Figure 32: Exercise goals



Source: <https://www.mondaycampaigns.org/move-it-monday/take-the-smart-approach-to-exercising-consistently>

- **Make it fun**

Encourage individuals to find physical activities that they enjoy and that are fun. This can help make exercise feel less like a chore and more like a pleasurable activity.

Figure 33: Fun exercise



Source: <https://playonpediatric.com/2023/02/16/what-is-physical-literacy-why-is-it-important/>

- Provide social support

Encourage individuals to exercise with friends, family members, or in a group setting. This can provide social support, accountability, and motivation.

Figure 34: Social support



Source: <https://www.elderlifefitness.co.uk/book-online>

- **Use positive reinforcement**

Provide positive feedback and reinforcement when individuals engage in physical activity. This can help them feel more confident and motivated to continue exercising.

Figure 35: Positive environment

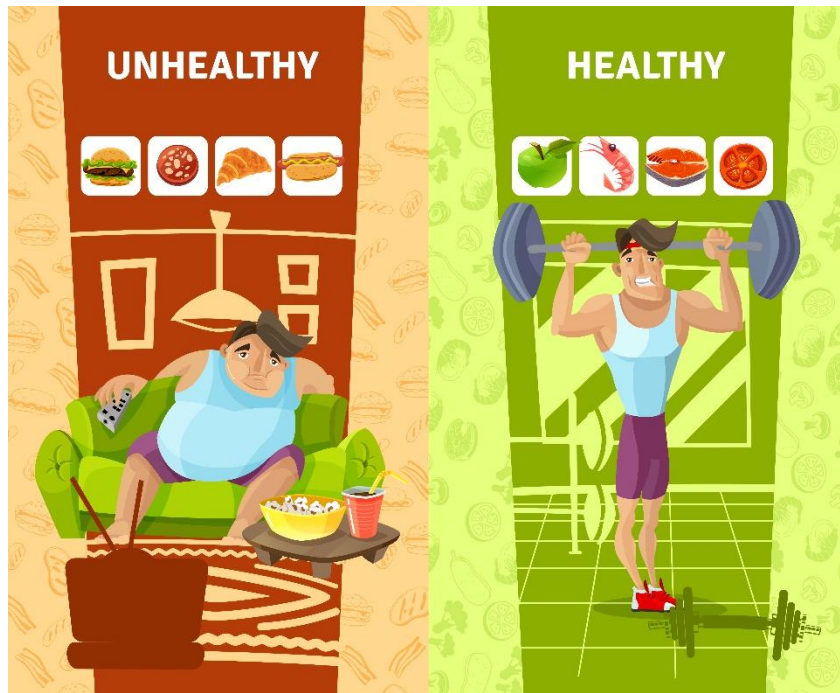


Source: <https://www.verywellfamily.com/positive-reinforcement-child-behavior-1094889>

- **Provide education**

Educate individuals about the benefits of physical activity and the risks of a sedentary lifestyle. This can help them understand the importance of regular exercise and motivate them to make it a priority.

Figure 36: Importance of regular exercise



Source: <https://www.fitnasticindia.com/obesity>

- **Make it accessible**

Make physical activity accessible and convenient for individuals. This can include providing information about local parks, gyms, or fitness classes, or encouraging individuals to incorporate physical activity into their daily routines.

- **Provide incentives**

Provide incentives such as rewards or recognition for achieving physical activity goals. This can help motivate individuals to stay active and maintain their progress.

Figure 37: Wellness Initiatives



Source: <https://mbailegroup.com/blog/wellness-initiatives-promote-physical-activity-at-work/>

It is important to remember that motivation to be physically active can vary from person to person and may require different strategies. Therefore, it is important to work with individuals to understand their personal preferences and motivations, and to tailor strategies accordingly.

Physical activities and people with disabilities

Physical activity is important for people with disabilities, as it can provide numerous health benefits and improve overall quality of life. However, individuals with disabilities may face unique barriers to physical activity, including lack of accessibility, social stigma, and limited availability of adapted equipment and facilities.

Here are some examples of physical activities that can be adapted for people with disabilities:

Swimming

Swimming is a low-impact activity that can be adapted for individuals with a range of disabilities. Accessible facilities and equipment, such as pool lifts and specialized flotation devices, can help make swimming more accessible.

Wheelchair sports

Wheelchair sports, such as basketball, rugby, and tennis, are designed specifically for individuals with mobility impairments. These sports can provide opportunities for competition and social interaction.

Figure 38: Wheelchair basketball



Source: <https://www.paralympic.org/news/usa-stage-late-comeback-deny-hosts-japan-wheelchair-basketball-final>

Yoga and Tai chi

Yoga and tai chi are low-impact activities that can be adapted for individuals with physical disabilities. Modified poses and movements can be used to accommodate different abilities and mobility levels.

Figure 39: Adaptive yoga



Source: <https://www.doyou.com/13-organizations-at-the-forefront-of-accessible-yoga-20750/>

Adaptive cycling

Adaptive cycling involves using specialized equipment, such as hand cycles, recumbent bikes, and tricycles, to accommodate different disabilities. This can provide a low-impact and enjoyable form of exercise for individuals with mobility impairments.

Figure 40: Adaptive cycling



Source: <https://www.cyclingutah.com/adaptive-cycling/a-new-perspective-how-adaptive-cycling-can-impact-lives/>

Strength training

Strength training can help improve muscle strength and function for individuals with physical disabilities. Adapted equipment, such as resistance bands and modified weight machines, can be used to accommodate different abilities and mobility levels.

It is important to note that physical activity for individuals with disabilities should be done in consultation with a healthcare professional and adapted to individual needs and abilities. Accessible facilities and equipment, as well as social support and education, can also help make physical activity more accessible and enjoyable for individuals with disabilities.

Benefits of physical activity for people with disabilities

Physical activity provides numerous benefits for people with disabilities, including:

Figure 41: Adaptive swimming



Source: IPAK photo

- Improved cardiovascular health

Physical activity can help improve heart and lung function, which can reduce the risk of cardiovascular disease and other related conditions.

- Increased strength and mobility

Regular physical activity can help build and maintain muscle strength and flexibility, which can improve mobility and reduce the risk of falls.

- Improved mental health

Physical activity has been shown to improve mental health and reduce the risk of depression and anxiety in people with disabilities.

- Improved quality of life

Physical activity can improve overall quality of life by increasing energy levels, reducing stress, and promoting social interaction.

Figure 42: Swimming for persons with disabilities



Source: IPAK photo

- Reduced risk of secondary conditions

Physical activity can help reduce the risk of secondary conditions, such as pressure sores, urinary tract infections, and respiratory infections, which are common among people with disabilities.

- Enhanced independence

Physical activity can help individuals with disabilities maintain or improve their independence by improving mobility and reducing the need for assistance with activities of daily living.

- Increased participation in daily activities

Physical activity can improve individuals' ability to participate in daily activities, such as self-care, work, and recreational activities.

Overall, physical activity can play an important role in improving the health and well-being of people with disabilities. It is important to consult with a healthcare professional to determine the most appropriate and safe physical activity for individual needs and abilities.

Physical activities and promotion of social inclusion

Physical activities can play an important role in promoting social inclusion, particularly for individuals who may face social barriers or marginalization. Participating in physical activities can provide opportunities for social interaction and integration, and help individuals develop social skills and networks.

Figure 43: Inclusive swimming



Source: IPAK photo

Here are some examples of how physical activities can promote social inclusion:

Team sports

Team sports, such as basketball, soccer, and volleyball, provide opportunities for individuals to work together towards a common goal, and develop social skills such as communication, cooperation, and leadership.

Figure 44: Team sports



Source: IPAK photo

Fitness classes

Group fitness classes, such as yoga, dance, and aerobics, can provide a supportive and inclusive environment where individuals can meet new people and develop friendships.

Figure 45: Fitness class



Source: <https://www.sciencephoto.com/media/765526/view/exercise-class-for-disabled-people>

Community events

Community events, such as charity walks or runs, can provide opportunities for individuals to participate in physical activity while raising awareness and funds for important causes. These events can also promote a sense of community and shared purpose.

Figure 46: Community event



Source: <https://www.makeawillonline.co.uk/fundraising-online-wills/>

Adaptive sports

Adaptive sports, such as wheelchair basketball or para-swimming, are designed specifically for individuals with disabilities. Participating in these sports can provide opportunities for competition and social interaction with others who have similar experiences and challenges.

Figure 47: Adaptive sports



Source: <https://www.efdn.org/blog/news/sportanddev-call-for-articles-on-inclusion-of-persons-with-disability-in-sport/>

Outdoor activities

Outdoor activities, such as hiking, camping, and kayaking, can provide opportunities for individuals to connect with nature and each other. These activities can also promote a sense of adventure and personal growth.

Physical activity can provide numerous opportunities for social interaction and connection, and can help individuals develop a sense of belonging and purpose. By promoting inclusive physical activities, we can help ensure that everyone has the

opportunity to participate in and benefit from physical activity, regardless of their social or economic background.

How to organize physical activity for people with disabilities.

Physical activity is important for everyone, including individuals with disabilities. However, organizing physical activity for people with disabilities requires careful planning and consideration of individual needs and abilities. Here are some tips for organizing physical activity for people with disabilities:

- Determine individual needs and abilities

It is important to determine the individual needs and abilities of each participant to ensure that physical activity is safe and appropriate. Consider factors such as mobility, balance, and sensory impairments, and work with healthcare professionals to determine the most appropriate physical activity for each participant.

Figure 48: Adaptive sports



Source: <https://www.alamy.com/stock-photo/disabled-skiing-handicapped-skiing.html?sortBy=relevant>

- Provide accessible facilities and equipment

Physical activity facilities and equipment should be accessible to people with disabilities. This includes providing ramps, accessible parking spaces, and assistive devices such as wheelchairs or walkers. Exercise equipment should also be modified or adapted as needed to ensure that it is safe and accessible.

Figure 49: Equipment in adaptive sports



Source: IPAK photo

- **Provide appropriate instruction and supervision**

Physical activity instructors should have training and experience working with people with disabilities. They should be able to modify exercises as needed to accommodate individual needs and abilities. It is also important to provide supervision to ensure that physical activity is being performed safely and correctly.

- **Create a supportive and inclusive environment**

Physical activity should be conducted in a supportive and inclusive environment that encourages participation and social interaction. This can be achieved by creating a welcoming and friendly atmosphere, and encouraging participants to support and motivate each other.

- **Offer a variety of physical activities**

Offering a variety of physical activities can help ensure that there is something for everyone. This can include team sports, fitness classes, outdoor activities, and adaptive sports. It is important to consider individual interests and preferences when selecting physical activities.

- **Provide opportunities for feedback and evaluation**

Feedback and evaluation can help ensure that physical activity is meeting the needs and goals of participants. It is important to provide opportunities for participants to provide feedback, and to regularly evaluate the effectiveness of physical activity programs.

Organizing physical activity for people with disabilities requires careful planning and consideration of individual needs and abilities. By providing accessible facilities and equipment, appropriate instruction and supervision, a supportive and inclusive

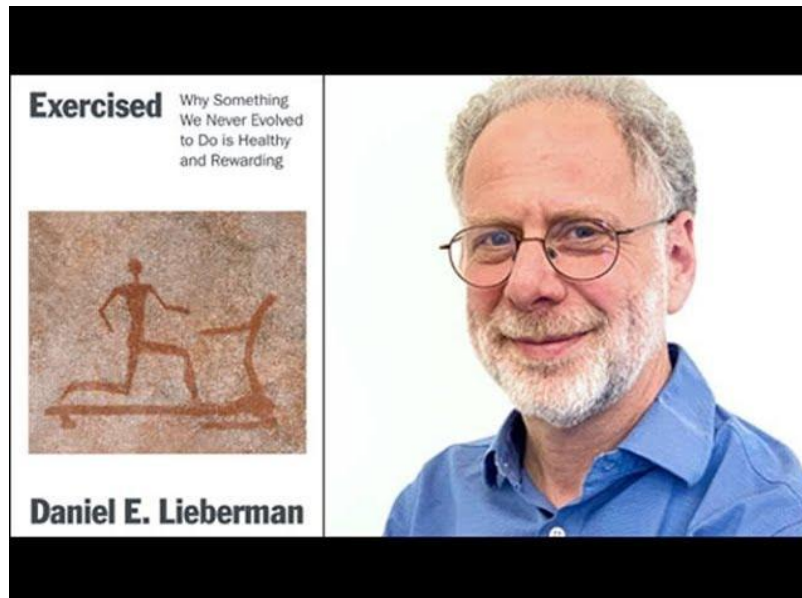
environment, a variety of physical activities, and opportunities for feedback and evaluation, we can help ensure that physical activity is safe, enjoyable, and beneficial for everyone.

Sources :

"Exercised: Why Something We Never Evolved to Do Is Healthy and Rewarding" is a book written by Daniel Lieberman, a professor of human evolutionary biology at Harvard University. The book explores the human evolution and the role of physical activity in our lives.

Lieberman argues that human beings evolved to move, but that modern life has made it too easy for us to avoid physical activity. He explains how physical activity is essential for our physical and mental health and provides evidence from studies to support this claim. He also explores the various ways in which physical activity can benefit us, including improving cognitive function, reducing the risk of chronic diseases, and even helping us to sleep better.

Figure 50:



Source:

The book also covers the challenges that people face when it comes to exercise, such as time constraints, lack of motivation, and the modern sedentary lifestyle. Lieberman offers practical tips for overcoming these obstacles and making physical activity a regular part of our lives.

Overall, "Exercised" is an insightful and informative book that highlights the importance of physical activity in our lives and provides useful advice for anyone looking to improve their health and well-being.

While "Exercised" offers a wealth of information on the importance of physical activity, some critics have raised concerns about the book's narrow focus on evolutionary biology and its lack of attention to other factors that impact physical activity.

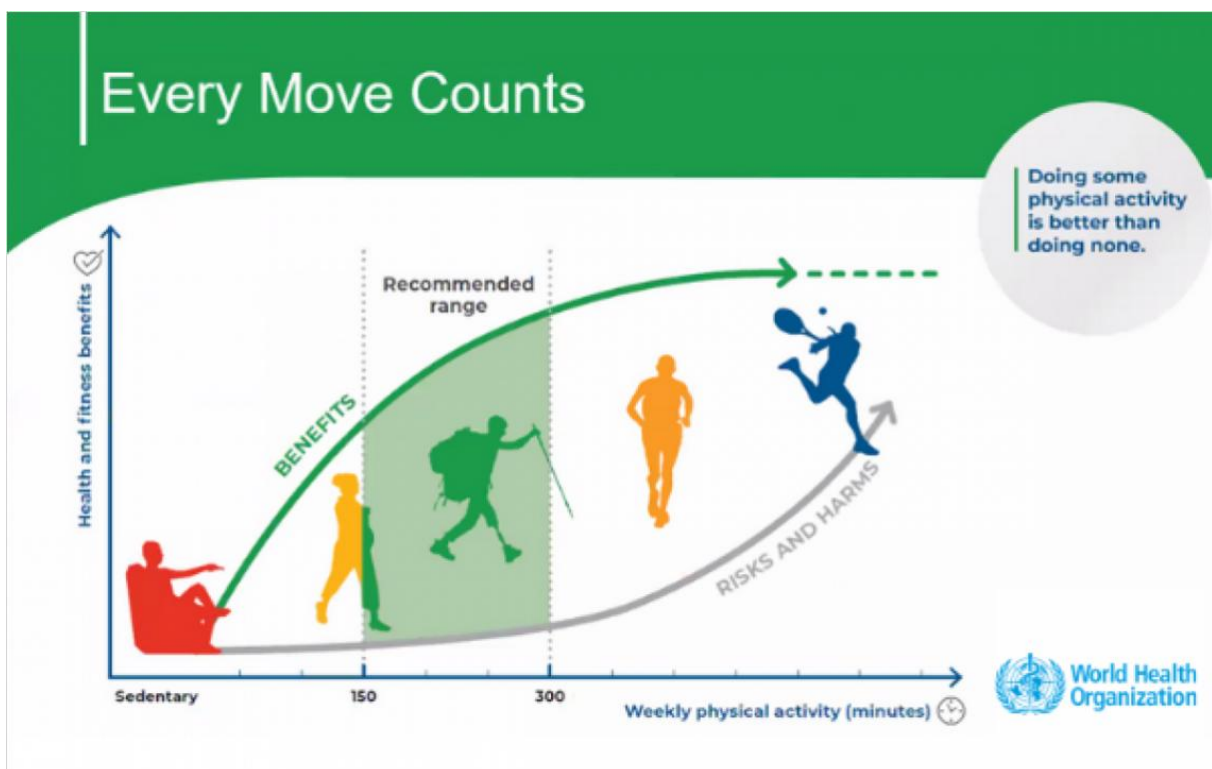
Some have also criticized the book for being overly technical and academic, with dense scientific language that may be difficult for the average reader to understand. Others have noted that while the book offers practical tips for overcoming obstacles to exercise, it does not address the systemic barriers that prevent many people from accessing safe and affordable opportunities for physical activity.

Additionally, some critics have pointed out that the book overlooks the importance of diverse forms of physical activity, such as dance or yoga, that may be more accessible and enjoyable for some individuals than traditional forms of exercise. Finally, some have noted that the book does not provide a comprehensive analysis of the complex relationship between physical activity and health outcomes, including the potential risks associated with overexertion or injury.

You can watch prof. Lieberman on [YouTube](#).

On Thursday November 26th, the World Health Organisation launched their Guidelines on [Physical Activity and Sedentary Behaviour](#) under the title of “Every Move Counts”. The guidelines highlight that any physical activity of any intensity counts and is good for health.

Figure 51: Every count moves



Source: <https://www.europeactive.eu/news/new-who-physical-activity-guidelines-have-been-launched-and-every-move-counts>

The Guidelines recommend that adults get between 150 to 300 minutes of moderate to vigorous physical activity weekly and that children participate in 60 minutes daily of moderate-to-vigorous physical activity. The guidelines also look for the first time at

sedentary behaviour which can be detrimental to health and recommend that these behaviours be reduced for all age groups and abilities.

The report *Physical activity for general health in disabled children and disabled young people: summary of a rapid evidence review for the UK Chief Medical Officers' update of the physical activity guidelines. Department of Health and Social Care: London, UK, 2022* summarizes a rapid evidence review conducted by the Department of Health and Social Care in the UK on the physical activity guidelines for disabled children and young people. The review highlights the importance of physical activity in improving general health outcomes for disabled children and young people, including cardio respiratory fitness, muscular strength, bone density, and mental health. The review also identifies the barriers and facilitators to physical activity participation among disabled children and young people, and provides evidence-based recommendations for physical activity guidelines, including types, frequency, duration, and intensity of physical activity. The report emphasizes the need for tailored physical activity guidelines that consider the specific needs and abilities of disabled children and young people, as well as the importance of involving them in the co-creation and implementation of such guidelines. The main message of report is “the available evidence indicates that for likely improved health outcomes it is important for disabled children and disabled young people to participate in 120 to 180 minutes of aerobic physical activity per week at a moderate-to-vigorous intensity. The evidence suggests that this may be achieved in different ways (for example, 20 minutes per day or 40 minutes 3 times per week), and how to translate this evidence on frequency and duration into the most appropriate message will be examined by the infographic co-producers (that is, disabled children and disabled young people).”

Environmental protection

"Earth provides enough to satisfy every man's needs, but not every man's greed."

- Mahatma Gandhi

Introduction

Environmental pollution refers to the contamination of the environment by harmful substances that are released into the air, water, and soil. Pollution can come from natural sources, but it is mostly caused by human activities. Pollution has negative impacts on human health, biodiversity, and the environment at large. In this article, we will discuss the main causes of environmental pollution.

Industrial pollution Industrial pollution is one of the main causes of environmental pollution. Industries release a variety of pollutants, including chemicals, metals, and gases. Chemical waste from industries can seep into the soil, contaminating the groundwater, and polluting water bodies such as rivers, lakes, and oceans. Industrial pollution also releases toxic gases, including carbon monoxide, sulfur dioxide, and nitrogen oxides, which can cause respiratory problems, acid rain, and climate change. F.e. Fossil based power plant in Šoštanj is large source of greenhouse gases. It provides 30% of electricity in Slovenia. It is the biggest carbon dioxide polluter in Slovenia released 3,760,438 tons of carbon dioxide last year

Figure 52: Fossil based power plant in Šoštanj



Source: <https://sloveniatimes.com/alstom-successor-strikes-plea-bargain-in-tes6-trial/>

Transportation pollution Transportation pollution is another major cause of environmental pollution. Vehicles emit a significant amount of pollutants, including carbon monoxide, nitrogen oxides, and particulate matter, which can have severe impacts on human health. The use of fossil fuels in transportation contributes to greenhouse gas emissions, which can cause climate change.

Figure 53: Transport



Source: <https://gothamist.com/news/american-lung-association-nycs-air-quality-is-improving-but-still-gets-a-failing-grade>

Agricultural pollution Agriculture is a significant source of environmental pollution. Pesticides, fertilizers, and animal waste are released into the environment, contaminating the soil and water bodies. The use of pesticides and fertilizers can also lead to the loss of biodiversity and harm pollinators such as bees, butterflies, and birds.

Figure 54: Agricultural pollution



Source: <https://www.epa.gov/nutrientpollution/sources-and-solutions-agriculture>

Waste pollution Waste pollution is a significant environmental problem. Improper disposal of waste, including plastic waste, electronic waste, and hazardous waste, can lead to soil, water, and air pollution. Plastic waste in particular is a severe environmental issue because it takes hundreds of years to decompose and can harm wildlife.

Figure 55: Waste pollution



Source: <https://inhabitat.com/renewlogy-turns-low-grade-plastic-into-usable-fuels/>

Construction and building pollution Construction activities can contribute to environmental pollution. Construction sites generate significant amounts of waste, including construction debris and toxic chemicals such as lead and asbestos. These pollutants can harm the environment and human health if not properly disposed of.

Figure 56: Building pollution



Source: http://www.china.org.cn/environment/2014-04/30/content_32248128.html

Mining pollution Mining is another significant source of environmental pollution. Mining activities release pollutants such as heavy metals, acids, and toxic chemicals into

the environment. Mining also leads to deforestation, soil erosion, and the loss of biodiversity.

Figure 57: Exploitation of coal at Velenje, Slovenia



Source: <https://www.visitsaleska.si/hr/saleska-valley/druzmirsko-jezero-2/>

Oil and gas pollution Oil and gas exploration and production can cause severe environmental pollution. Oil spills can harm marine life, damage ecosystems, and contaminate water bodies. The production and burning of fossil fuels contribute to greenhouse gas emissions and climate change.

Figure 58: Oil and gas pollution



Source: <https://www.nestinteractive.org/>

The oil and gas industry produces vast amounts of toxic air and water pollution and is the largest source of greenhouse gas emissions in the United States.

Conclusion Environmental pollution is a significant problem that poses severe risks to human health, biodiversity, and the environment. The main causes of environmental pollution are industrial pollution, transportation pollution, agricultural pollution, waste pollution, construction pollution, mining pollution, and oil and gas pollution. Reducing pollution requires a concerted effort from individuals, industries, and governments to adopt sustainable practices and reduce reliance on fossil fuels.

Individuals and environmental protection

The greatest threat to our planet is the belief that someone else will save it.

- Robert Swan

Environmental protection is an essential aspect of human life, and it involves the preservation of the natural environment and its resources. Environmental protection aims to promote a healthy and sustainable environment that supports human life and enhances the quality of life. The responsibility for environmental protection lies with individuals, governments, and businesses. In this article, we will focus on the role of individuals in environmental protection.

In the late 1980 thousands of people from Šaleška Valley participated on meeting protested against air pollution caused by fossil based power plant in Šoštanj. It was first such protest in Yugoslavia. Now it is called "Ecological revolution" After meeting Power plant installed the devices for removal of NO_x and SO_x gases. The quality of air improved significantly. It is a proof that people can save the planet.

Figure 59: Protest against air pollution, Šaleška Valley



Source: <https://sloveniatimes.com/alstom-successor-strikes-plea-bargain-in-tes6-trial/>

Individual Actions for Environmental Protection

Individuals can take several actions to protect the environment. Some of these actions include:

1.1. Refuse, Reduce, Reuse, Recycle and Rot

The Five Rs give us a new framework for dealing with waste in our lives, in part by helping us acknowledge the habits that lead to more waste and more trash. Refusing helps eliminate a lot of waste from the start. It's about saying “no” to free stuff that becomes instant waste, like single-use plastics, disposable coffee cups, utensils, and straws. By reducing waste, individuals can reduce pollution and conserve resources. Simply reduce what you're purchasing by being mindful about what you need and want. Individuals can reduce their waste by buying food in bulk, refusing single use low-quality products, and reducing usage of water and electricity. Reusing items such as bags, bottles, and containers, as well as buying second hand, and recycling materials such as paper, plastic, and glass, can reduce the total waste that we produce, reduce pollution and conserve resources. Rot: Food scraps and other compostables that are sent to the landfill break down in an anaerobic environment (a place lacking oxygen) and create methane gas, which is 25 times worse than carbon dioxide as a harmful greenhouse gas. By repurposing compostable waste either with composting or giving it to composting services, you are directly decreasing landfill waste, therefore reducing methane gas.

Figure 60: Selected collection of waste



Source: <https://orwigsburg.gov/services/garbage-recycling/>

1.2. Conserve Water

Water is a precious resource, and individuals can conserve it by taking shorter showers, fixing leaks, and using water-efficient appliances. Conserving water can help to reduce water pollution and ensure that there is enough water for future generations.

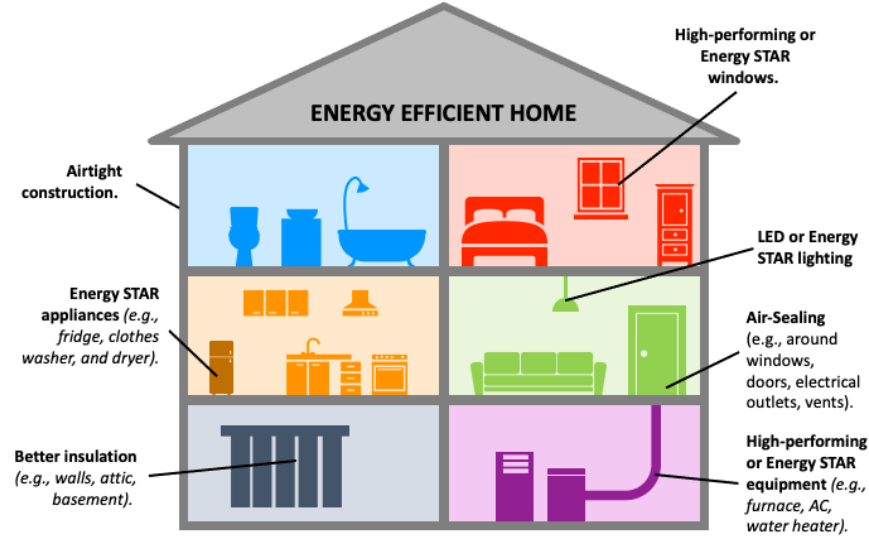
1.3. Use Energy Efficiently

Using energy-efficient appliances, turning off lights and electronics when not in use, and using public transportation or carpooling are some of the ways individuals can conserve energy. Conserving energy can help to reduce greenhouse gas emissions and combat climate change.

Figure 61: Energy efficiency

ENERGY EFFICIENT HOME

What Makes a Home Energy-Efficient?



source- nrcan.gc.ca/homes

Source: <https://www.collidu.com/presentation-energy-efficient-home>

1.4. Support Renewable Energy

Individuals can support renewable energy sources such as solar, wind, and hydro power. By supporting renewable energy, individuals can help to reduce reliance on fossil fuels, which contribute to greenhouse gas emissions and climate change.

Figure 62: Renewable energy



Source: <https://thebusinesswiz.co.tz/2023/03/21/astra-energy-to-set-up-50mw-clean-and-renewable-energy-park-in-zanzibar/>

1.5. Choose Sustainable Products

Individuals can choose sustainable products that are environmentally friendly and have a minimal impact on the environment. Sustainable products are made from renewable resources, are recyclable, and are produced using environmentally friendly methods.

Figure 63: Sustainable products



Source: <https://absolutelyshabbylass.co.uk/product-category/kind-living/>

Environmental Education

Environmental education is an essential aspect of environmental protection. Individuals can educate themselves and others about the importance of protecting the environment and the actions they can take to reduce their impact on the environment. Environmental education can take many forms, including formal education, informal education, and community outreach programs.

Figure 64: Education



Source: <https://pediatricassociates.com/community/teaching-children-the-importance-of-volunteering/>

2.1. Formal Education

Formal education, including primary, secondary, and tertiary education, can provide individuals with the knowledge and skills needed to understand environmental issues and take action to protect the environment. “The Tbilisi Declaration of 1977, the first intergovernmental conference of Environmental Education” organized by UNESCO, laid out the guiding principle of environmental education.

What is Environmental Education?



2.2. Informal Education

Informal education, such as documentaries, online resources, and community events, can also provide individuals with information and resources to protect the environment.

2.3. Community Outreach Programs

Community outreach programs, such as community gardens, litter cleanups, and environmental clubs, can provide individuals with opportunities to take action and make a difference in their local communities.



Individual Advocacy

Individuals can also advocate for environmental protection by supporting environmental organizations, contacting their elected officials, and participating in public demonstrations. Advocacy can help to raise awareness of environmental issues and promote action on a local, national, and global level.

Conclusion

Environmental protection is a shared responsibility that requires action from individuals, businesses, and governments. Individuals can take action to protect the environment by reducing waste, conserving water, using energy efficiently, supporting renewable energy, choosing sustainable products, and educating themselves and others about environmental issues. By taking action, individuals can make a significant impact on the environment and help to create a sustainable and healthy planet for future generations.

What to eat to save a planet

The food we eat has a significant impact on the environment. Agriculture, including the production of crops and livestock, contributes to greenhouse gas emissions, deforestation, and water pollution. Therefore, changing our diet can help to reduce our impact on the environment. In this article, we will discuss what to eat to save the planet.



Sustainable diets are “protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy while optimising natural and human resources”.

Plant-Based Diet

A plant-based diet involves consuming primarily plant-based foods such as fruits, vegetables, legumes, nuts, and whole grains, and reducing or eliminating animal products. A plant-based diet has many benefits for the environment, including:

1.1. Reducing Greenhouse Gas Emissions

The production of meat and dairy products contributes significantly to greenhouse gas emissions, particularly carbon dioxide and methane. A plant-based diet can help to reduce these emissions.

1.2. Preserving Water Resources

Animal agriculture requires a significant amount of water for production, including watering crops and providing drinking water for livestock. A plant-based diet can help to preserve water resources by reducing water usage for food production.

1.3. Reducing Deforestation

Animal agriculture requires vast amounts of land for grazing and growing feed crops. This has led to deforestation in many areas, particularly in tropical regions. A plant-based diet can help to reduce the demand for animal products and reduce the need for deforestation.

Sustainable Seafood

Seafood is a healthy and sustainable source of protein, but overfishing and unsustainable fishing practices have led to depletion of fish populations and damage to marine ecosystems. To eat sustainable seafood, consumers should:

2.1. Choose Sustainable Species

Consumers should choose seafood that is sustainably sourced, such as wild-caught salmon, mackerel, and sardines. These species are generally abundant and have healthy populations.

2.2. Avoid Overfished Species

Consumers should avoid overfished species such as bluefin tuna, swordfish, and shark. These species are at risk of extinction and are not sustainable choices.

2.3. Support Sustainable Fishing Practices

Consumers should support sustainable fishing practices such as fishing methods that minimize bycatch, the unintentional capture of non-target species, and support fishing communities that practice sustainable methods.

Locally Sourced Food

Buying food that is locally sourced has many benefits for the environment. Locally sourced food:

3.1. Reduces Food Miles

Food transportation contributes to greenhouse gas emissions through the burning of fossil fuels. Buying locally sourced food reduces the distance food travels, thereby reducing the environmental impact of transportation.

3.2. Supports Local Farmers

Buying locally sourced food supports local farmers and promotes local economies.

3.3. Reduces Food Waste

Local farmers often sell their produce directly to consumers, which reduces food waste by reducing the need for storage, packaging, and transportation.

Organic Food

Organic food is grown without the use of synthetic fertilizers, pesticides, or genetically modified organisms. Organic food has many benefits for the environment, including:



4.1. Reducing Chemical Pollution

Organic farming avoids the use of synthetic fertilizers and pesticides, which can contaminate soil and water resources, and harm wildlife.

4.2. Promoting Soil Health

Organic farming practices promote soil health through the use of compost and crop rotation, which can improve soil fertility and reduce erosion.

4.3. Supporting Biodiversity

Organic farming promotes biodiversity by avoiding the use of synthetic chemicals that can harm wildlife.

Conclusion

Changing our diet can have a significant impact on the environment. A plant-based diet can help to reduce greenhouse gas emissions, preserve water resources, and reduce deforestation. Choosing sustainable seafood, locally sourced food, and organic food can also help to reduce our impact on the environment. By making conscious food choices, we can help.

Sports and environment

"The environment is where we all meet; where all have a mutual interest; it is the one thing all of us share."

- Lady Bird Johnson

"Sports and the environment go hand in hand. It's all about respecting our natural resources and being good stewards of the planet."

- Lindsey Vonn

Introduction

Sports have become an integral part of human culture, providing a way for people to exercise, socialize, and compete. However, sports activities can also have a significant impact on the environment. In this article, we will discuss the relationship between sports and the environment, and ways to make sports more environmentally friendly.



Environmental Impact of Sports

Sports activities can have a significant impact on the environment in various ways, including:

1.1. Waste Generation

Sports events can generate large amounts of waste, including plastic bottles, food containers, and packaging. This waste can contribute to landfills, pollution, and harm wildlife.

Figure 65: Waste in sports event



Source: <https://www.bbc.com/news/uk-wales-50389804>

1.2. Energy Consumption

Sports activities can require a significant amount of energy, including the use of electricity for lighting, heating, and cooling. Energy consumption can contribute to greenhouse gas emissions and climate change.

Figure 66: Energy consumption in halls



Source: <https://www.shutterstock.com/search/ice-rink>

1.3. Water Usage

Water is an essential resource for many sports activities, including swimming, water polo, and water skiing. However, excessive water usage can lead to water scarcity and harm aquatic ecosystems.

Sustainable Sports Practices

To reduce the environmental impact of sports activities, various sustainable practices can be implemented, including:

2.1. Reduce Waste Generation

Sports organizations can implement waste reduction practices such as reducing single-use plastics, encouraging recycling, and using compostable packaging. Fans can also contribute to waste reduction by bringing reusable water bottles and food containers to sports events.

2.2. Energy Efficiency

Sports organizations can improve energy efficiency by using energy-efficient lighting, heating, and cooling systems, and promoting public transportation to reduce the use of personal vehicles.

2.3. Water Conservation

Sports organizations can implement water conservation practices such as using water-efficient fixtures, collecting and reusing rainwater, and promoting water-saving practices.

2.4. Sustainable Venue Design

Sports venues can be designed with sustainability in mind, including the use of sustainable building materials, green roofs, and renewable energy sources such as solar and wind power.

Eco-Friendly Sports Equipment

Sports equipment can also have an impact on the environment, particularly when made from non-renewable resources or manufactured using harmful chemicals. Eco-friendly sports equipment can help to reduce the environmental impact of sports activities, including:

3.1. Sustainable Materials

Sports equipment manufacturers can use sustainable materials such as bamboo, recycled plastic, and natural rubber in their products.

Figure 67: Sustainable equipment



Source: <https://www.greenmatters.com/p/eco-friendly-sports-equipment>

3.2. Chemical-Free Manufacturing

Sports equipment manufacturers can avoid using harmful chemicals such as PVC and lead in their products, and use environmentally friendly manufacturing processes.

3.3. End-of-Life Recycling

Sports equipment manufacturers can implement end-of-life recycling programs, where old or damaged equipment can be recycled or repurposed, reducing waste and promoting sustainability.

Conclusion

Sports activities have a significant impact on the environment, but by implementing sustainable practices and using eco-friendly equipment, we can reduce this impact. Sports organizations, fans, and equipment manufacturers can all play a role in promoting sustainable sports practices, contributing to a healthier and more sustainable planet.

Tips for reducing environmental pollution

Environmental pollution is a major global issue that requires collective action to address. While governments and corporations have a significant role to play in reducing pollution, individuals can also take steps to minimize their impact on the environment. Here are some tips for reducing environmental pollution:

Reduce Energy Consumption

Reducing energy consumption is one of the most effective ways to reduce environmental pollution. Some ways to do this include:

- Turn off lights and appliances when not in use
- Use energy-efficient light bulbs and appliances
- Adjust thermostat settings to conserve energy
- Unplug chargers and electronics when not in use
- Use public transportation, carpool, or bike instead of driving alone
- Use renewable energy sources such as solar or wind power when possible.

Reduce Water Usage

Water is a valuable resource that is often wasted. Some ways to conserve water include:

- Fixing leaky faucets and pipes
- Taking shorter showers
- Using a low-flow toilet
- Collecting rainwater for outdoor use
- Using a broom instead of a hose to clean outdoor spaces.

Reduce, Reuse, and Recycle

Reducing waste is a key way to reduce environmental pollution. Some tips for reducing waste include:

- Using reusable bags, water bottles, and food containers
- Avoiding single-use plastics such as straws and utensils
- Recycling paper, plastic, and metal
- Composting food waste and yard waste
- Donating or selling items instead of throwing them away.

Choose Eco-Friendly Products

Choosing eco-friendly products can help reduce pollution by minimizing the use of harmful chemicals and materials. Some ways to choose eco-friendly products include:

- Using natural and biodegradable cleaning products

Choosing products made from sustainable materials such as bamboo or recycled plastic
Buying products with minimal packaging or packaging that can be recycled
Supporting companies with environmentally sustainable practices.

Educate Yourself and Others

Education is a powerful tool for reducing environmental pollution. Some ways to educate yourself and others include:

Reading books, articles, and news about environmental issues

Attending environmental events and talks

Volunteering with environmental organizations

Sharing information and resources with friends and family

Encouraging others to adopt environmentally sustainable practices.

In conclusion, reducing environmental pollution requires collective action and effort. By making small changes in our daily lives, we can all contribute to a healthier and more sustainable planet.

Food

"Let food be thy medicine and medicine be thy food."

- Hippocrates

Why is food important?

Food is an essential component of our lives, providing us with the necessary energy and nutrients to sustain life. It plays a vital role in maintaining our overall health and well-being. Eating a balanced diet can help us prevent a wide range of diseases, boost our immune system, and maintain a healthy weight.

One of the primary reasons why food is important is that it provides our bodies with the energy they need to carry out daily activities. The food we eat contains carbohydrates, proteins, and fats that are broken down by our bodies to release energy. Without adequate energy, we would not be able to perform tasks such as walking, talking, and thinking.

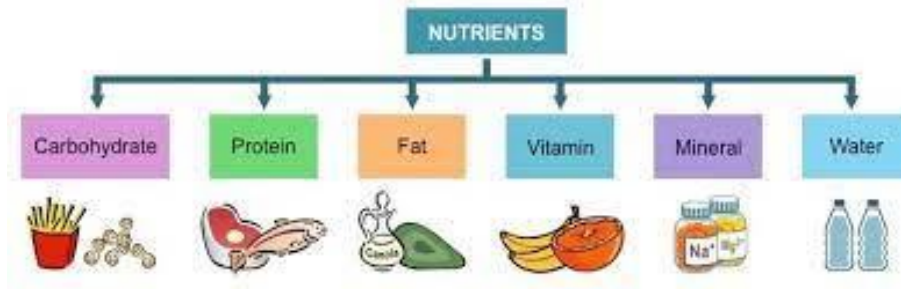
Figure 68: Energy and Food



Source: <https://www.herbazest.com/wellness/boost-your-energy-with-food>

Another crucial aspect of food is its role in providing essential nutrients to our bodies. These nutrients include vitamins, minerals, and trace elements that our bodies need to function correctly. For example, calcium is essential for building and maintaining strong bones, while iron is necessary for carrying oxygen in our blood. Eating a well-balanced diet can help ensure that we get all the necessary nutrients our bodies need to function correctly.

Figure 69: Nutrients



Source: <https://www.botorzo.co.in/components-of-food/>

Food is also important in preventing and managing various diseases. Certain foods contain antioxidants and anti-inflammatory compounds that can help reduce the risk of chronic diseases such as heart disease, diabetes, and cancer. Eating a healthy diet can help lower cholesterol levels, reduce inflammation, and prevent the development of various health conditions.

Figure 70: Food Pyramid



Source: <http://www.samstern.co.uk/blog/birthday-blog/>

In addition to its physical benefits, food also plays an important role in our mental and emotional well-being. Eating a healthy diet can help improve mood, reduce stress, and enhance cognitive function. Conversely, a poor diet can lead to mood swings, fatigue, and cognitive decline.

Figure 71: Food that helps Depression

Foods That Help Depression



Source: <https://www.pixstory.com/story/foods-that-help-relieve-depression/82222>

Food is also an important part of social and cultural identity. Sharing meals with family and friends is an essential part of many cultures, and the foods we eat can provide a sense of comfort and familiarity. Food can also be an expression of creativity and a way to connect with others through the shared experience of cooking and eating.

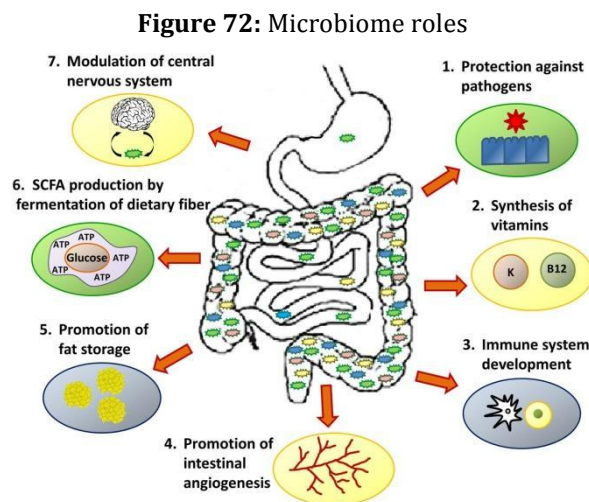
In conclusion, food is essential to our physical, mental, and emotional well-being. It provides us with the energy and nutrients we need to function correctly, can help prevent and manage various diseases, and plays an important role in our social and cultural lives. Eating a balanced and healthy diet is crucial in maintaining good health and preventing chronic diseases.

Microbiome

The microbiome is a term used to describe the trillions of microorganisms that live inside and on our bodies. These microorganisms, which include bacteria, viruses, fungi, and parasites, play a vital role in maintaining our health by supporting our immune system, aiding in digestion, and producing essential nutrients.

The microbiome is composed of both beneficial and harmful microorganisms. When the balance between these microorganisms is disrupted, it can lead to various health problems. For example, an overgrowth of harmful bacteria in the gut can lead to digestive issues such as bloating, gas, and diarrhea. Similarly, an imbalance in vaginal bacteria can lead to infections such as bacterial vaginosis and yeast infections.

Research has shown that the microbiome also plays a critical role in the development of various chronic diseases, including obesity, diabetes, and autoimmune disorders. Studies have found that people with these conditions tend to have an altered microbiome compared to healthy individuals. For example, individuals with obesity tend to have a less diverse microbiome, with an overgrowth of harmful bacteria. This altered microbiome has been linked to inflammation, insulin resistance, and weight gain.



Source: https://commons.wikimedia.org/wiki/File:Microbiota_roles.png

The microbiome also plays a crucial role in supporting the immune system. Beneficial bacteria in the gut can help stimulate the production of antibodies, which help fight off harmful pathogens. These bacteria can also help modulate the immune response, preventing the immune system from attacking the body's own tissues.

The microbiome is also involved in the production of essential nutrients such as vitamin K and B vitamins. Beneficial bacteria in the gut can help break down and absorb nutrients from the foods we eat, ensuring that our bodies have the necessary nutrients for optimal health.

The microbiome can be influenced by a variety of factors, including diet, lifestyle, and environment. For example, a diet high in processed foods and sugar can promote the growth of harmful bacteria in the gut, while a diet rich in fiber and whole foods can

support the growth of beneficial bacteria. Other factors that can influence the microbiome include stress, medications, and exposure to toxins.

There are several ways to promote a healthy microbiome, including eating a balanced and diverse diet, getting enough sleep, managing stress, and avoiding the overuse of antibiotics. Probiotics and prebiotics, which are supplements that contain beneficial bacteria and food for these bacteria, respectively, can also help promote a healthy microbiome.

In conclusion, the microbiome plays a vital role in maintaining our overall health and well-being. It supports our immune system, aids in digestion, and produces essential nutrients. An imbalanced microbiome can lead to various health problems, including chronic diseases. Promoting a healthy microbiome through diet and lifestyle changes can help support optimal health.

Healthy diet

Healthy diet is essential for maintaining good health and preventing chronic diseases. It refers to eating foods that are rich in nutrients and beneficial for our bodies. These foods provide our bodies with the necessary nutrients such as vitamins, minerals, and antioxidants, which help keep our bodies functioning at an optimal level.

A healthy diet should include a variety of foods from different food groups, including fruits, vegetables, whole grains, lean proteins, and healthy fats. These foods provide a wide range of nutrients that our bodies need to function properly.

Fruits and vegetables are an essential part of a healthy diet. They are rich in vitamins, minerals, and antioxidants that help protect our bodies from chronic diseases. They also provide fiber, which helps regulate digestion and promote a feeling of fullness.



Whole grains are another essential component of a healthy diet. They are rich in fiber, vitamins, and minerals and can help lower the risk of chronic diseases such as heart disease, diabetes, and cancer. Examples of whole grains include brown rice, quinoa, whole wheat bread, and oats.



Lean proteins, such as chicken, fish, beans, and tofu, are also an essential part of a healthy diet. They provide our bodies with the necessary building blocks for muscles, bones, and other tissues. Additionally, they help regulate blood sugar levels, which is important for maintaining good health.



Healthy fats, such as those found in nuts, seeds, avocados, and fatty fish, are also important for maintaining good health. They provide our bodies with essential fatty acids, which are necessary for many bodily functions, including brain function and hormone production.



Source: <https://www.psychiatrycentre.co.uk/blog/food-and-mood-beat-depression/>

In contrast, unhealthy foods, such as processed and fast foods, are typically high in calories, unhealthy fats, and added sugars. These foods can contribute to chronic diseases such as obesity, diabetes, and heart disease.

To maintain a healthy diet, it is important to limit the consumption of unhealthy foods and focus on eating a variety of healthy foods. Additionally, portion control is important, as eating too much of even healthy foods can lead to weight gain.

In conclusion, healthy diet is essential for maintaining good health and preventing chronic diseases. A healthy diet should include a variety of foods from different food groups, including fruits, vegetables, whole grains, lean proteins, and healthy fats. By making healthy food choices and practicing portion control, we can maintain optimal health and well-being.

Unhealthy diet

Unhealthy diet is defined as eating food that is high in calories, unhealthy fats, and added sugars. These foods are typically processed and/or fast foods that are low in nutrients and fiber, and high in salt and preservatives.

Examples of unhealthy foods include fast food items such as burgers, fries, and pizza, as well as processed snacks such as chips, candy, and sugary drinks. These foods are often high in calories and low in nutrients, which can lead to weight gain and a range of chronic health conditions, including diabetes, heart disease, and certain cancers.



Unhealthy fats, such as trans fats and saturated fats, are commonly found in unhealthy foods. These fats can increase bad cholesterol levels and contribute to the development of heart disease.

Added sugars are another common component of unhealthy foods. These sugars provide empty calories, meaning they offer no nutritional value, and can contribute to weight gain, tooth decay, and other health problems.



Consuming too much unhealthy food can lead to a range of health problems, including obesity, high blood pressure, high cholesterol, and insulin resistance. These conditions can increase the risk of developing chronic diseases, such as heart disease, stroke, and type 2 diabetes.

In conclusion, unhealthy food is characterized by its high calorie, unhealthy fat, and added sugar content. These foods are often processed and low in nutrients, which can lead to a range of health problems if consumed in excess. To maintain good health, it is important to limit the consumption of unhealthy foods and focus on a balanced diet that is rich in nutrient-dense whole foods.

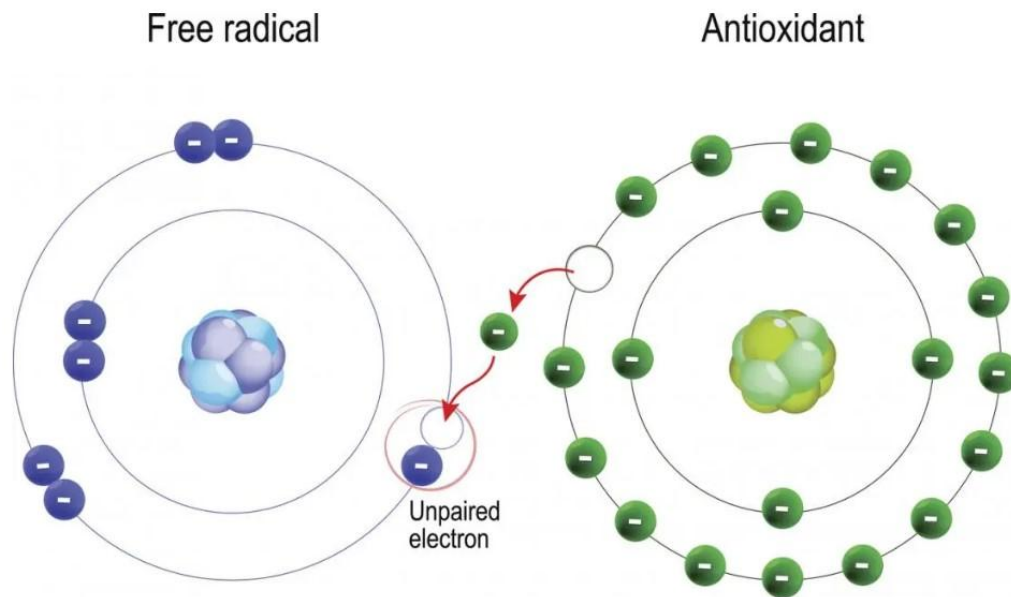
Food and immune systems

The immune system is a complex network of cells, tissues, and organs that work together to defend the body against harmful pathogens such as bacteria, viruses, and fungi. A healthy diet is essential for maintaining a strong and effective immune system. Here are some ways in which food can help support the immune system:

Nutrient-Dense Foods: A diet rich in fruits, vegetables, whole grains, lean proteins, and healthy fats provides the body with essential nutrients such as vitamins A, C, and E, zinc, and omega-3 fatty acids, all of which play important roles in immune function.

Free radicals and Antioxidants: Free radicals can lead to oxidative stress, which can damage the body's cells, leading to a range of diseases and causing symptoms of aging, such as wrinkles. Antioxidants are chemicals that lessen or prevent the effects of free radicals. They donate an electron to free radicals, thereby reducing their reactivity.

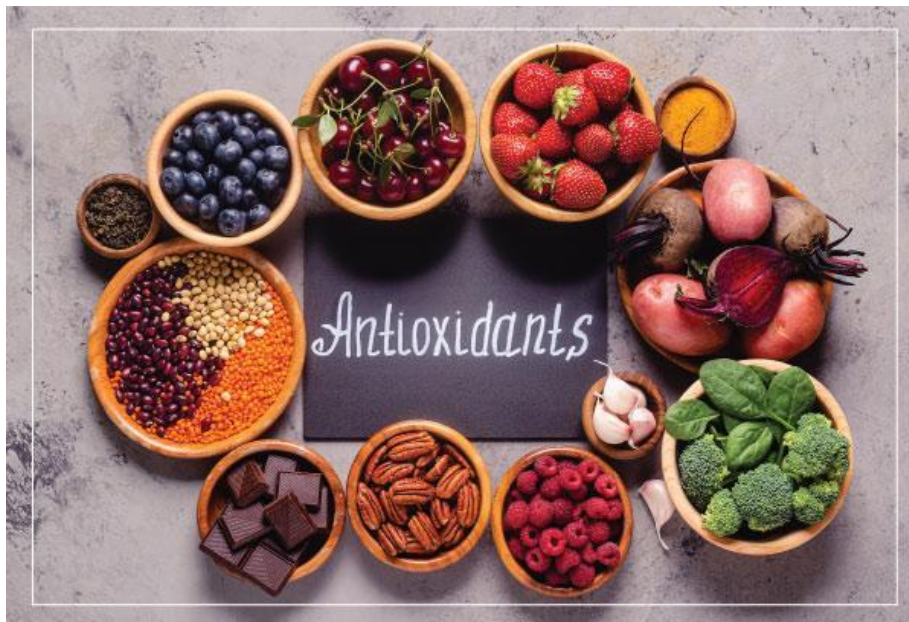
How do free radicals damage the body?



Free radicals are unstable atoms. To become more stable, they take electrons from other atoms. This may cause diseases or signs of aging.

<https://drautoimmune.com/the-immune-power-of-antioxidants/>

Antioxidants: Antioxidants, found in many fruits and vegetables, help protect cells from damage caused by harmful free radicals. This helps support immune function by preventing damage to cells that are important for immune defense.



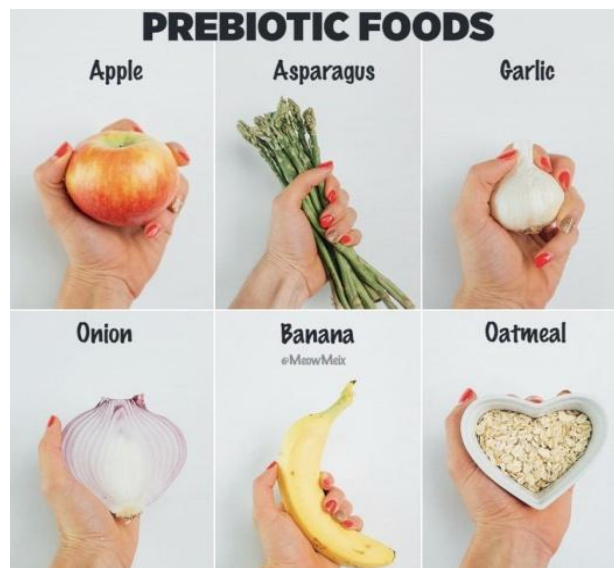
<https://www.wellcurve.in/blog/antioxidant-rich-foods/>

Probiotics: Probiotics are live bacteria that are beneficial for gut health. A healthy gut is important for immune function as it is home to a large portion of the immune system. Probiotic-rich foods such as yogurt, kefir, and sauerkraut can help promote gut health.



<https://www.verywellhealth.com/fermented-foods-health-benefits-7111638>

Prebiotics: Prebiotics are fiber-rich foods that feed the beneficial bacteria in the gut. These foods include onions, garlic, bananas, and asparagus. A healthy gut microbiome is important for immune function.



<https://meowmeix.com/eat-more-prebiotic-foods-for-a-happier-healthier-gut/>

Water: Staying hydrated is important for overall health, including immune function. Drinking plenty of water helps flush toxins from the body and keeps cells functioning optimally.



<https://www.healthychildren.org/English/safety-prevention/all-around/Pages/Is-Your-Drinking-Water-Safe.aspx>

On the other hand, a diet that is high in processed foods, sugar, and unhealthy fats can have negative effects on the immune system. A diet lacking in essential nutrients can weaken the immune system, making it more susceptible to infections and illnesses.



In conclusion, a healthy diet is essential for maintaining a strong and effective immune system. Eating a variety of nutrient-dense foods, including fruits, vegetables, whole grains, lean proteins, and healthy fats, can help support immune function. Probiotics, prebiotics, and staying hydrated can also contribute to a healthy immune system. By making healthy food choices, we can help support our immune system and protect against illnesses and diseases.

How storing, processing and cooking change the food.

Storing, processing, and cooking can all change the properties of food in various ways. Here are some examples:

Storing: Food storage can impact the nutritional content of food. Some vitamins and minerals are sensitive to light, air, and temperature, and can degrade over time. For example, storing fruits and vegetables at room temperature can cause a loss of vitamin C. Refrigeration can slow down the rate of nutrient loss and extend the shelf life of food. However, over time, even refrigerated food can lose some of its nutritional value.

Processing: Food processing can involve various methods, including freezing, canning, and drying. These methods can have different effects on the nutritional content of food. For example, freezing can cause some nutrient loss, particularly vitamin C. Canning involves high heat, which can cause nutrient loss, particularly for heat-sensitive vitamins like vitamin C and thiamine. Drying can also cause some nutrient loss.

Cooking: Cooking can break down some of the nutrients in food, particularly if it is overcooked or cooked at high temperatures. For example, vitamin C is sensitive to heat and can be destroyed during cooking. On the other hand, cooking can also enhance the bioavailability of some nutrients, making them easier for the body to absorb. For example, cooking can break down the tough cell walls of vegetables, making their nutrients more accessible.

In addition to nutritional changes, storing, processing, and cooking can also affect the flavor, texture, and appearance of food. Some foods, like tomatoes and carrots, can actually increase in antioxidant content when cooked. However, it's important to note that overcooking can lead to nutrient loss, and cooking methods that involve high heat, such as grilling and frying, can create harmful compounds that have been linked to cancer.

Overall, storing, processing, and cooking can all have an impact on the nutritional content of food. To maximize the nutritional value of food, it's important to choose fresh, minimally processed foods whenever possible, and to cook them using methods that preserve their nutritional content, such as steaming or sautéing, rather than high-heat methods like grilling and frying.

Food description of main categories

There are many ways to categorize foods, but one common method is to divide them into groups based on their nutritional composition. Here are some of the main food categories:

Fruits and Vegetables: These foods are rich in vitamins, minerals, fiber, and other beneficial plant compounds. They include a wide variety of colorful fruits and vegetables, such as leafy greens, berries, citrus fruits, tomatoes, carrots, and more.



Grains: This category includes foods made from grains, such as bread, rice, pasta, and cereals. Whole grains, which contain the entire grain kernel, are a particularly nutritious choice, as they are rich in fiber, vitamins, and minerals.



Protein Foods: This category includes both animal and plant-based sources of protein, such as meat, poultry, fish, beans, tofu, and nuts. Protein is important for building and repairing tissues in the body, and many protein-rich foods also contain other important nutrients, such as iron and zinc.



Dairy: Dairy products, such as milk, cheese, and yogurt, are a rich source of calcium, vitamin D, and other nutrients. However, they can also be high in saturated fat, so it's important to choose low-fat or fat-free options whenever possible.



Fats and Oils: While some fats are essential for good health, others can be harmful in large amounts. This category includes foods such as butter, margarine, cooking oils, and salad dressings.



It's important to note that these categories are not mutually exclusive, and many foods can fit into more than one category. For example, nuts are a source of both protein and healthy fats, while sweet potatoes are both a vegetable and a source of carbohydrates. Eating a varied diet that includes foods from all of these categories can help ensure that you get a wide range of nutrients to support your health.

Tips for healthy diet

Maintaining a healthy diet is key to promoting overall health and wellness. Here are some tips to help you build a healthy eating plan:

- Choose a variety of whole foods: Aim to eat a variety of whole, nutrient-dense foods from each food group. These foods are rich in vitamins, minerals, and fiber, and can help you feel full and satisfied.
- Eat plenty of fruits and vegetables: These foods are packed with nutrients and fiber, and can help protect against chronic diseases like heart disease and cancer.
- Include healthy sources of protein: Choose lean protein sources like chicken, fish, beans, and tofu to help build and repair tissues in the body.
- Choose healthy fats: Focus on consuming healthy fats, such as those found in nuts, seeds, avocados, and fatty fish, while limiting saturated and trans fats.
- Watch portion sizes: Pay attention to portion sizes and use smaller plates to help control how much you eat.
- Limit added sugars: Avoid sugary drinks and limit your intake of added sugars found in processed foods, such as candy, cakes, and cookies.
- Stay hydrated: Drink plenty of water and other low-calorie beverages to stay hydrated and support proper bodily functions.
- Prepare meals at home: Cooking meals at home allows you to control the ingredients and portion sizes, which can help you make healthier choices.
- Practice mindful eating: Focus on eating slowly and mindfully, paying attention to the flavors and textures of your food, and stopping when you feel full.
- Seek guidance from a healthcare professional: If you have specific dietary needs or health concerns, speak with a healthcare professional or registered dietitian for personalized guidance and support.

Sources:

Spoon-Fed: Why Almost Everything We've Been Told About Food is Wrong. Jonathan Cape (1921)

The book "**Spoon-Fed: Why Almost Everything We've Been Told About Food is Wrong**" is a thought-provoking book written by Tim Spector, a professor of genetic epidemiology at King's College London. The book challenges many of the assumptions we have about food and nutrition, and presents a compelling case for why we need to rethink our approach to eating.

One of the key arguments of the book is that the current obsession with counting calories and reducing fat intake is misguided. Spector argues that what we eat is far more important than how much we eat, and that a diverse and varied diet is essential for good health. He also argues that the microbiome, the community of microorganisms that

live in our gut, plays a crucial role in our overall health and well-being, and that we need to pay more attention to this aspect of our diet.

Spector's writing style is engaging and accessible, and he does a good job of explaining complex scientific concepts in a way that is easy to understand. He also provides plenty of real-world examples and anecdotes to illustrate his points, which makes the book both informative and entertaining to read.

Overall, I would highly recommend "Spoon-Fed" to anyone who is interested in learning more about nutrition and the science of eating. Spector presents a compelling case for why we need to rethink our approach to food, and his insights are sure to challenge many of the assumptions you have about what it means to eat healthily.

While "Spoon-Fed" is generally well-received, there are some criticisms of the book. Here are a few:

- **Oversimplification:** Some critics argue that Spector oversimplifies complex scientific concepts, such as the role of genetics in our diet and the workings of the microbiome. They suggest that he glosses over important nuances and details in order to present a more compelling argument.
- **Lack of nuance:** Related to the above, some critics argue that Spector's arguments lack nuance and rely too heavily on anecdotal evidence. They suggest that he overstates his case in some instances and ignores important counterarguments.
- **Biases:** Some critics have suggested that Spector has certain biases that may influence his perspective on nutrition. For example, he is a proponent of the Mediterranean diet and has received funding from companies that produce products that fit within this diet. While Spector acknowledges these potential biases in the book, some readers may still find them concerning.
- **Lack of practical advice:** While Spector does offer some practical advice on how to improve our diets, some readers may feel that the book is more focused on presenting a critique of current dietary trends than on providing actionable advice for how to eat better.

Overall, while there are some criticisms of "Spoon-Fed," many readers and experts have found the book to be informative and thought-provoking. As with any book, it is important to approach it critically and to consider a range of perspectives before drawing your own conclusions.

There is talk with Spector on youtube:

<https://www.youtube.com/watch?v=xKZiI3XGmGI>

There are several podcasts on address <https://joinzoe.com/learn/category/podcasts>

The CBC article "Food guru Tim Spector's top ten tips for a healthier diet" summarizes the key takeaways from Tim Spector's book "Spoon-Fed" and provides practical advice for how to eat a healthier diet. Here are the main points:

- **Eat a diverse range of foods:** Spector emphasizes the importance of eating a wide variety of foods to promote a healthy microbiome and overall health.
- **Eat fermented foods:** Fermented foods, such as kimchi and yogurt, are rich in beneficial bacteria that can help support a healthy gut.

- Eat more plants: A diet that is rich in fruits, vegetables, and whole grains has been linked to a lower risk of chronic disease
- Eat less meat: While Spector doesn't advocate for a completely vegetarian or vegan diet, he suggests reducing meat intake in favor of plant-based proteins.
- Don't fear fat: Spector argues that fat is an essential part of a healthy diet and that low-fat diets are not necessarily healthier.
- Avoid processed foods: Highly processed foods can disrupt the microbiome and have been linked to a range of health problems.
- Don't count calories: Spector suggests focusing on the quality of food rather than the quantity, and not becoming too fixated on calorie counting.
- Avoid artificial sweeteners: Artificial sweeteners have been linked to a range of health problems and may disrupt the microbiome.
- Be mindful of portion sizes: While Spector doesn't advocate for strict portion control, he suggests being mindful of portion sizes and avoiding overeating.
- Enjoy your food: Finally, Spector emphasizes the importance of enjoying your food and not becoming too fixated on strict rules or restrictions.

On website <https://joinzoe.com/> you can find more about The personalized nutrition program. ZOE is a health science company that is focused on revolutionizing personalized nutrition. They use advanced data analytics, scientific research, and machine learning to analyze people's unique responses to different foods. Through their research, they aim to provide people with personalized recommendations for optimal nutrition and health. Their mission is to empower people to make informed choices about their diet, and to ultimately improve the health and well-being of individuals around the world. ZOE has developed an at-home test kit, which includes a microbiome test, blood test, and an app-based assessment tool to analyze the data and provide personalized nutrition insights.

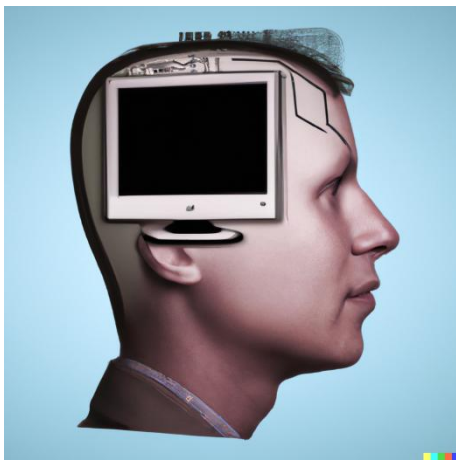
Microbiome refers to the collective genomes of the micro-organisms in a particular environment, and microbiota is the community of micro-organisms themselves. Approximately 100 trillion micro-organisms (most of them bacteria, but also viruses, fungi, and protozoa) exist in the human gastrointestinal tract—the microbiome is now best thought of as a virtual organ of the body. The human genome consists of about 23 000 genes, whereas the microbiome encodes over three million genes producing thousands of metabolites, which replace many of the functions of the host,¹³ consequently influencing the host's fitness, phenotype, and health.

Brain

Neuroscience is by far the most exciting branch of science because the brain is the most fascinating object in the universe. Every human brain is different - the brain makes each human unique and defines who he or she is.

- Stanley B. Prusiner

Scientists say that the most powerful computer in the world is located between our ears. And while there are a number of manuals on how to use personal computers, laptops, and smartphones, there are no manuals on how to use the most powerful computer in the universe - the BRAIN, regardless of the fact that brain science has advanced tremendously in the last thirty years.



First we will describe the anatomy of brain and its role in survival, and after that we will discuss the difference between brain and computers, and how we could use the knowledge how brain is working for improvement of efficiency of intellectual work.

The anatomy of brain and how it works

The human brain has 100 billion neurons, each neuron connected to 10 thousand other neurons. Sitting on your shoulders is the most complicated object in the known universe.

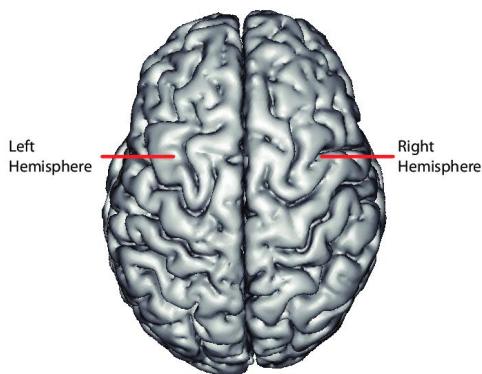
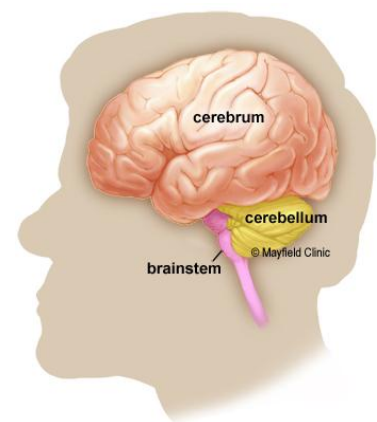
- Michio Kaku

The brain is the most complex organ in the human body. It controls every function of the body, from breathing to thinking, and is responsible for our emotions, memories, and consciousness. The study of the brain is a field of science called neuroscience, which seeks to understand the structure and function of this incredible organ.

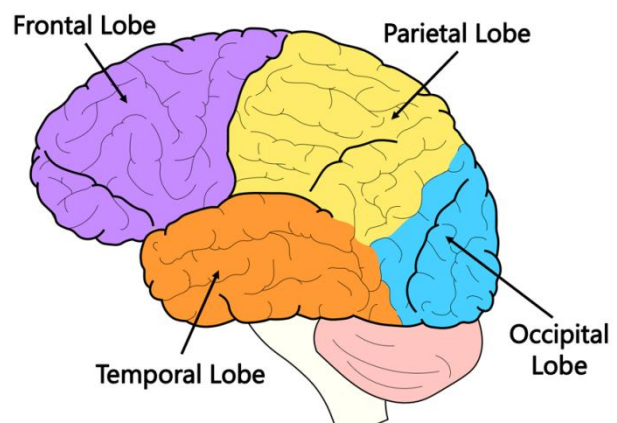
The anatomy of the brain can be divided into three main parts: the cerebrum, the brainstem, and the cerebellum.

The cerebrum is the largest part of the brain and is responsible for consciousness, movement, and sensation. It is divided into two hemispheres, the left and the right, and each hemisphere is further divided into four

lobes: the frontal lobe, the parietal lobe, the temporal lobe, and the occipital lobe.



The frontal lobe is responsible for decision-making and planning, the parietal lobe is responsible for spatial awareness and sensory perception, the temporal lobe is responsible for memory and language, and the occipital lobe is responsible for vision.

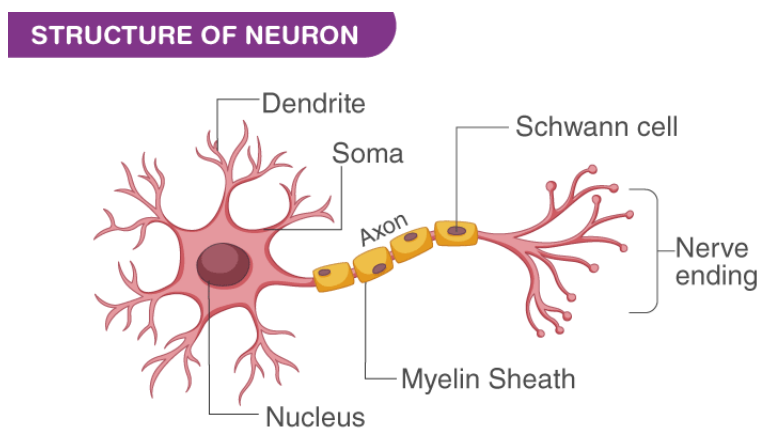


The brainstem is the part of the brain that connects the brain to the spinal cord. It is responsible for controlling many vital functions of the body, including breathing, heart rate, and blood pressure. The brainstem is also the site of many reflexes, such as the blink reflex and the gag reflex.

The cerebellum is the part of the brain that is responsible for coordinating movement and balance. It is located at the back of the brain, below the cerebrum, and is made up of two hemispheres. The cerebellum receives information from the sensory systems of the body and uses this information to coordinate and refine movement.

The brain works through a complex network of neurons, which are specialized cells that transmit information throughout the body. They are the fundamental building blocks of the brain and play a crucial role in how the brain functions.

Each neuron consists of a cell body, dendrites, and an axon. The cell body contains the nucleus and other organelles that are responsible for maintaining the cell's functions. Dendrites are the branching projections of the neuron that receive signals from other neurons, while the axon is a long, thin projection that carries signals away from the cell body to other neurons or to other parts of the body.



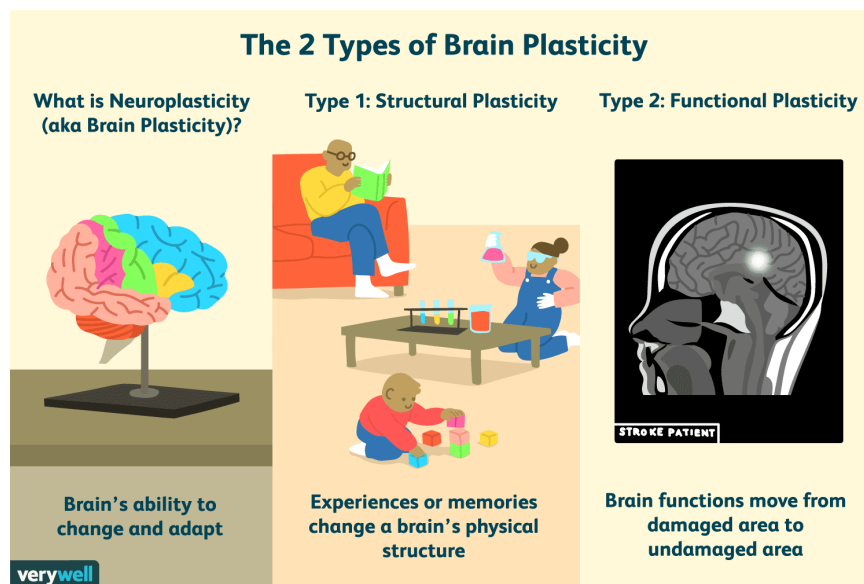
<https://www.treatingneuropathy.org/experimental-molecular-therapy-for-restoring-nerve-insulation/>

The function of neurons is to communicate with other neurons through electrical and chemical signals. When a neuron is stimulated, it generates an electrical signal that travels down the axon and triggers the release of chemical messengers called neurotransmitters at the synapse. These neurotransmitters then bind to receptors on the dendrites of neighboring neurons, initiating a new electrical signal in that neuron. This process allows neurons to pass information from one to another and to integrate multiple signals to produce a response.

Different types of neurons have different functions in the brain. Sensory neurons are responsible for detecting external stimuli, such as light, sound, or touch, and transmitting this information to the brain. Motor neurons control muscle movements by sending signals from the brain to the muscles. Interneurons are responsible for integrating information from sensory and motor neurons and communicating with other interneurons to produce more complex behaviors and cognitive processes.

The brain also contains specialized cells called glial cells, which provide support and protection to neurons. Glial cells are involved in many important functions of the brain, including regulating the flow of nutrients and waste products, and repairing damage to neurons.

The brain is also able to change and adapt in response to experiences, a process called neuroplasticity. Neuroplasticity allows the brain to reorganize itself in response to injury or disease, and also allows it to learn and remember new information.



<https://www.verywellmind.com/what-is-brain-plasticity-2794886>

In conclusion, the anatomy of the brain is a complex and fascinating topic. The brain is responsible for controlling every function of the body, from breathing to thinking, and is made up of three main parts: the cerebrum, the brainstem, and the cerebellum. The brain works through a complex network of neurons and glial cells, and is able to process information through neural coding. Understanding the structure and function of the brain is essential for understanding human behavior and for developing treatments for neurological disorders.

The role of brain as survival organ.

"The brain is a far more open system than we ever imagined, and nature has gone very far to help us perceive and take in the world around us. It has given us a brain that survives in a changing world by changing itself."

- Norman Doidge

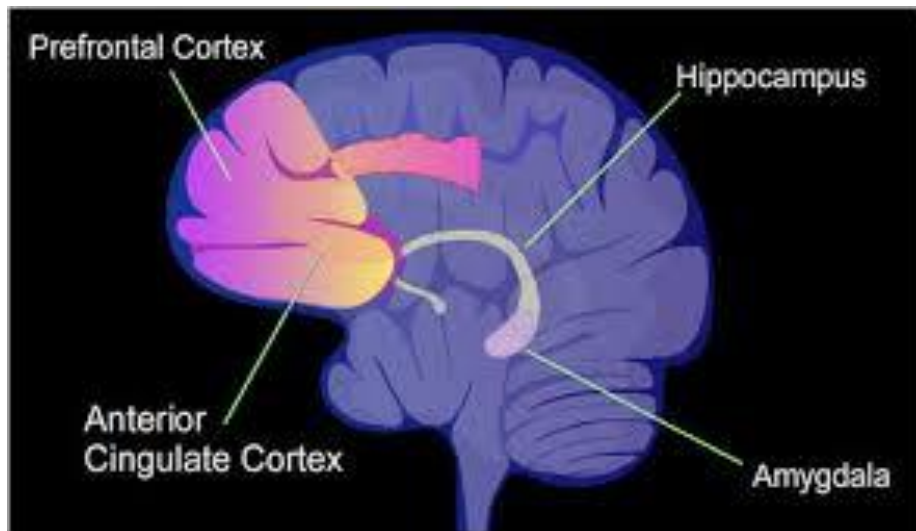
The brain is a vital organ that plays a crucial role in human survival. It is responsible for controlling and coordinating all of the body's functions, including breathing, digestion, and movement. Additionally, the brain is the center of cognition, emotions, and behavior, which are essential for individuals to adapt to their environment and ensure their survival.

One of the primary roles of the brain as a survival organ is to process sensory information from the environment and generate appropriate responses. The sensory organs, such as the eyes, ears, and skin, gather information about the world and send it to the brain for processing. The brain then interprets this information and generates responses that help the individual survive. For example, when a person sees a predator approaching, the brain triggers a "fight or flight" response, which prepares the body to either defend itself or escape. This response involves the release of hormones, such as adrenaline and cortisol, which increase heart rate and blood pressure, and prepare the body to take action.



Another critical function of the brain as a survival organ is to regulate physiological processes that are essential for life, such as respiration, circulation, and metabolism. The brainstem, which is located at the base of the brain, controls many of these processes, such as heart rate, blood pressure, and breathing. These processes are essential for maintaining homeostasis, which is the body's ability to maintain a stable internal environment in the face of changing external conditions.

The brain is also responsible for regulating behavior and decision-making, which are essential for survival. The prefrontal cortex, which is located in the front of the brain, is responsible for decision-making, planning, and impulse control. These functions are critical for individuals to make informed decisions that maximize their chances of survival. For example, if a person is lost in the wilderness, the prefrontal cortex will help them make decisions about where to go and what resources to seek out.



<https://neurosciencenews.com/self-control-obesity-10818/>

The brain also plays a critical role in social behavior, which is essential for human survival. The ability to form social bonds and work collaboratively with others is essential for individuals to gather resources and protect themselves from threats. The brain has specialized regions, such as the amygdala and the prefrontal cortex, which are involved in processing social information and generating appropriate responses. For example, when a person encounters a friend, the brain generates positive emotions, such as happiness and warmth, which encourage social bonding and strengthen relationships.



Finally, the brain has a remarkable ability to adapt to changing environments, a process called neuroplasticity. This ability allows the brain to reorganize itself in response to new experiences and learn new skills that are essential for survival. For example, if a person moves to a new environment, the brain will adapt to the new sensory input and generate appropriate responses that help the individual navigate the new environment.

In conclusion, the brain plays a critical role as a survival organ. It is responsible for processing sensory information, regulating physiological processes, controlling behavior and decision-making, and facilitating social behavior. The brain's remarkable ability to adapt to changing environments ensures that individuals can learn and respond appropriately to new challenges, maximizing their chances of survival.

The result of several researches of processes in the brain can be used for improvement of our cognitive abilities and learning process. Here we will describe some facts, which were generated by research.

Physical activity has a profound impact on our cognitive abilities. Scientists have discovered that exercise increases blood flow to tissues, including the brain, by stimulating blood vessels to produce nitric oxide molecules. As blood flow improves, new blood vessels are created, which penetrate deeper into the tissue. This process increases the distribution of nutrients and the removal of waste throughout the body, including the brain.

Research has shown that exercise also increases the volume of certain neurons in the brain, particularly in the dentate gyrus, which is an important part of the hippocampus responsible for memory formation. Moreover, exercise has been found to stimulate the production of one of the most crucial growth factors in the brain called BDNF (Brain Derived Neurotrophic Factor). BDNF keeps neurons healthy and supports the creation of new cells in the brain, particularly in the hippocampus, which is vital for cognitive abilities.

It is clear that being physically active is crucial for both physical and mental health. Regular exercise reduces the risk of various diseases, including those associated with aging such as dementia, Alzheimer's, and Parkinson's, and improves cognitive abilities such as learning.

Sleep is closely related to our ability to learn. When we sleep, the brain remains active most of the time and consumes the same amount of energy as when we are awake. However, research has shown that if we do not get enough sleep, our cognitive abilities can suffer. This can include weaker concentration, weaker executive functions, worse immediate memory, problems with logical reasoning, solving mathematical problems, motor problems, and more.

For example, soldiers can lose up to 30% of their cognitive abilities due to just one sleepless night, and two sleepless nights can cause a decrease in cognitive skills by up to 60%, which can negatively impact their effectiveness in action.

Getting enough sleep is essential for effective learning, but there is no universal rule for how much sleep a person needs. It varies from person to person. However, it has been established that the shortest amount of sleep per day that can improve cognitive efficiency is usually between 13 and 15 hours. NASA has found that even just 26 minutes of sleep in the afternoon can increase pilot efficiency by more than 34%.

Sleep also improves our ability to solve problems. It has been experimentally determined that when participants are given 12 hours to solve a problem after initial education, only 20% are able to find the solution. However, if participants are allowed to sleep for 8 hours during that 12-hour period, then 60% are able to find the solution. Therefore, the expression "let's sleep on the problem" is indeed true.

Stress has important role too. When we find ourselves in danger, our body releases adrenaline and cortisol as an immediate response. In the long history of our species, these responses were mainly response to physical attacks by animals or people and were short-term. However, the problems we face today, such as unemployment, financial problems, family issues, and problems at work, are long-term. However our body reacts to these problems as if we were in immediate physical danger.

Adrenaline speeds up our pulse, raises blood pressure, and releases a lot of energy, which is necessary for us to be able to defend ourselves (fight or flight). Another hormone, cortisol, brings our body back to normal. This response is helpful if the stress doesn't last long, measured in seconds. However, if the stress persists for hours, days, or even months, the presence of stress hormones can lead to cardiovascular defects, weakened immunity, and brain damage. Neurons can be separated from their networks, the generation of new neurons in the hippocampus (which is critical in the learning process) is interrupted, and severe stress can even destroy hippocampus cells. All of this has disastrous consequences for the learning process.

Research has shown that people under stress have difficulties with mathematics, language processing, and have poorer short-term and long-term memory, as well as difficulty concentrating. People under severe stress perform 50% worse on cognitive ability tests than people under low stress, especially in the areas of declarative memory and executive functions, which also includes problem-solving.

Therefore, the learning process should not be stressful. To learn successfully, we must reduce stress.

In last month there is a lot discussion about artificial intelligence and its impact on our life. However there are many facts that indicate that human being are still stronger than computers. We will discuss some of them.

To provide an introduction, let's compare some interesting facts about the brain to supercomputers. On average, the brain weighs about 1.5 kg, which is approximately 2% of a person's total weight. However, it uses about 20% of the oxygen we breathe, indicating that the brain is an energy-intensive organ. The average temperature of the brain is around 38.5°C, and in deeper regions, it can exceed 40°C, especially in women during the day. Remarkably, the brain does not require any cooling systems to function properly.



In contrast, the largest European supercomputer, LUMI has power of 8,5 MW (425.000 times more than human brain), occupies over 150m² of space, which is roughly the size of a tennis court, and weighs nearly 150,000 kilograms. Supercomputers require continuous cooling to prevent processors from overheating and failing.



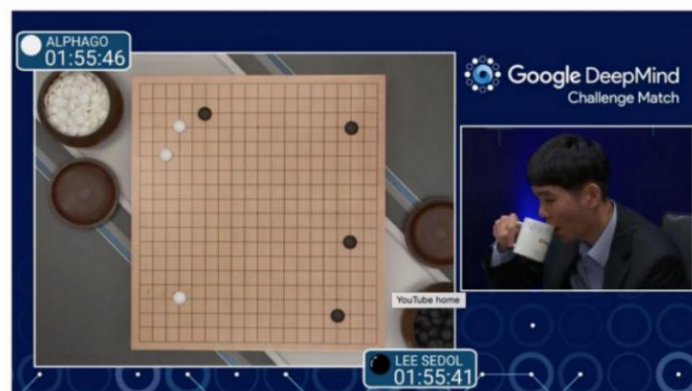
In terms of energy usage, the brain uses only about 20 watts of energy and can complete approximately 2 billion mega flops (where one mega flop is equivalent to a million operations per second). In comparison, an average home computer uses about 65 to 250 watts and can perform a few billion calculations per second.

The efficiency of the human brain is remarkable when compared to the most advanced supercomputers. Although our best supercomputers can compute about 8 billion mega flops, they require a massive 10 million watts, which is 100,000 times more energy than the human brain. Even with the latest technology, an iPad only uses about 2.5 watts and can perform about 170 mega flops, indicating that we have not yet reached the efficiency of the human brain.

Interestingly, when Kasparov lost the match against Big Blue, there was no discussion of the difference in energy consumption between Kasparov and the computer.



During the match organized in Seoul in 2016, the AlphaGo supercomputer consumed about 50,000 times more energy than the world champion in GO, Lee Sedol. These comparisons highlight the incredible energy efficiency and computational power of the human brain.



AlphaGO	Lee Se-dol
1202 CPUs, 176 GPUs, 100+ Scientists.	1 Human Brain, 1 Coffee.

<https://www.businessinsider.com/heres-how-much-computing-power-google-deepmind-needed-to-beat-lee-sedol-2016-3>

The human brain is an amazing and complex organ with significant advantages over artificial superintelligence. For one, the brain is made of organic matter, while computers are built from silicon. Additionally, while deep learning algorithms like those used in artificial intelligence are impressive, they are still just mathematical algorithms and cannot generate true intelligence.

Even the impressive Generative Pre-trained Transformer 3 (GPT-3) language model, released in 2020, can only produce human-like text through deep learning. While language is a critical aspect of human communication, it does not generate true intelligence.

Despite fears of artificial intelligence, it is important to recognize that such fears are largely unfounded. In fact, the real opportunity lies in learning to use artificial intelligence tools like ChatGPT to increase our intellectual efficiency. Kasparov's advanced chess matches provide an excellent example of the potential benefits of combining human intelligence with artificial intelligence. In these matches, teams consisting of both humans and chess programs competed against other teams with the same makeup. Ultimately, the teams that made the best use of computer support were victorious.



<https://en.chessbase.com/post/first-female-advanced-che-match-drawn-050413>

This example highlights the importance of knowing how to use artificial intelligence tools to their fullest potential in order to gain a competitive advantage in various fields. As technology continues to advance, it will become increasingly important for individuals and organizations to embrace these tools and learn how to use them effectively.

Sleep

"A good laugh and a long sleep are the two best cures for anything."

- Irish proverb

Process of sleeping

Sleep is a natural state of rest that is essential for physical and mental health. It is a complex process that involves several stages and cycles. Here's a brief overview of the process of sleeping:

Stage 1: This is the transition stage between wakefulness and sleep. It is a light sleep stage that usually lasts for a few minutes. During this stage, your brain activity begins to slow down, and your muscles start to relax.

Stage 2: This is a deeper sleep stage that lasts for about 20 minutes. During this stage, your heart rate and breathing slow down, and your body temperature drops.

Stage 3 and 4: These are the deep sleep stages, also known as slow-wave sleep. They are the most restorative stages of sleep and are crucial for physical and mental recovery. During these stages, your brain produces delta waves, and your muscles relax completely.



<https://deepstash.com/idea/90688/what-is-sleep-cycle>

REM Sleep: REM (Rapid Eye Movement) sleep is the stage of sleep where most dreaming occurs. It usually happens after about 90 minutes of falling asleep and recurs about every 90 minutes. During this stage, your eyes move rapidly, and your brain activity is similar to when you're awake.

The entire sleep cycle lasts about 90-120 minutes, and it typically repeats four to six times throughout the night. Each sleep stage is essential for different aspects of physical and mental health, and getting enough of each stage is crucial for feeling rested and alert during the day.

The importance of sleep

Sleep is vital for maintaining good physical and mental health. Here are some reasons why sleep is important:

Restores the body: During sleep, the body repairs and regenerates tissues, strengthens the immune system, and regulates hormones. This helps to reduce the risk of chronic health problems, such as diabetes, heart disease, and obesity.

Enhances cognitive function: Sleep plays a critical role in consolidating memories, improving learning and problem-solving abilities, and boosting creativity. Getting enough sleep can also help you maintain focus, attention, and alertness throughout the day.

Improves mood: Sleep has a significant impact on emotional regulation and can affect mood and behavior. A lack of sleep can lead to irritability, mood swings, and difficulty managing stress.

Increases productivity: Getting enough sleep can improve productivity, performance, and efficiency at work or school. Sleep deprivation, on the other hand, can lead to decreased productivity and increased errors and accidents.

Boosts athletic performance: Sleep is essential for athletes and fitness enthusiasts. It helps the body recover from physical exertion, improves reaction time, and enhances muscle repair and growth.

Overall, sleep is critical for physical health, cognitive function, emotional well-being, and overall quality of life. It is important to prioritize good sleep habits and ensure that you are getting enough restful sleep each night.

Daily napping

Daily napping can be beneficial for some individuals in certain situations, but it is not necessary or recommended for everyone. Here are some potential benefits and drawbacks of daily napping:



Benefits:

Increased alertness and cognitive function: A short nap of 20-30 minutes can help improve alertness, concentration, and memory recall.

Reduced fatigue: A brief nap can help reduce feelings of fatigue and increase energy levels.

Improved mood: Napping can help improve mood and reduce stress and anxiety.

Reduced risk of heart disease: Some studies suggest that regular napping may reduce the risk of heart disease.

Drawbacks:

Difficulty falling asleep at night: Napping during the day can make it harder to fall asleep at night, which can disrupt the natural sleep cycle and cause insomnia.

Sleep inertia: Waking up from a nap can cause sleep inertia, a period of grogginess and disorientation that can last for several minutes.

Interruption of work or school schedule: Napping during the day can interfere with work or school schedules, making it difficult to complete necessary tasks.

Not recommended for some individuals: Daily napping may not be recommended for individuals with certain medical conditions, such as sleep apnea, narcolepsy, or insomnia.

Overall, daily napping can be beneficial for some individuals in certain situations, such as shift workers or those who are chronically sleep-deprived. However, it is important to consider the potential drawbacks and to make sure that napping does not interfere with the natural sleep cycle or daily responsibilities.

Dreams

And by opposing end them? To die: to sleep;

No more; and by a sleep to say we end

The heart-ache and the thousand natural shocks

That flesh is heir to; 'tis a consummation

Devoutly to be wish'd. To die, to sleep;

To sleep: perchance to dream: ay, there's the rub;

For in that sleep of death what dreams may come

- W. Shakespeare in Hamlet

Dreams are a natural phenomenon that occur during the rapid eye movement (REM) stage of sleep. They can be vivid, imaginative experiences that take place in the mind while the body is at rest. The exact purpose of dreaming is still not fully understood, but there are many theories about why we dream and what they mean.

One of the most widely accepted theories about dreaming is that it is a way for the brain to process and consolidate memories. During sleep, the brain reviews and sorts through the day's events, filing away important memories and discarding unnecessary information. Dreams may be a way for the brain to make sense of these memories and process them on a deeper level.

Another theory about dreaming is that it is a way for the brain to work through unresolved emotions or conflicts. Dreams may provide a safe space for the mind to explore and express feelings that are difficult to confront in waking life. For example, someone who is experiencing stress or anxiety may have dreams that reflect these emotions, allowing them to work through them in a symbolic way.

Regardless of their purpose, dreams can be fascinating and sometimes mysterious experiences. They can be vivid and lifelike, or they can be abstract and surreal. Some people remember their dreams in great detail, while others may only have a vague recollection of what they dreamt about.

One of the most interesting aspects of dreaming is the symbolism that can be present in dreams. Many psychologists believe that dreams contain hidden meanings and messages that can be deciphered through careful analysis. For example, dreams about water may symbolize emotions or the unconscious mind, while dreams about falling may represent a fear of failure or loss of control.



The interpretation of dreams has been a subject of fascination for thousands of years. Ancient civilizations believed that dreams were a way to communicate with the divine, and many cultures developed their own systems for interpreting dreams. Today, dream analysis is still a popular practice among psychologists and therapists, who use it as a tool to help their patients gain insight into their subconscious minds.

While dreams can be a source of inspiration and insight, they can also be the source of nightmares and anxiety. Nightmares are a type of dream that can be particularly distressing, often involving feelings of fear, dread, or danger. They can be caused by a variety of factors, including stress, anxiety, or traumatic experiences.

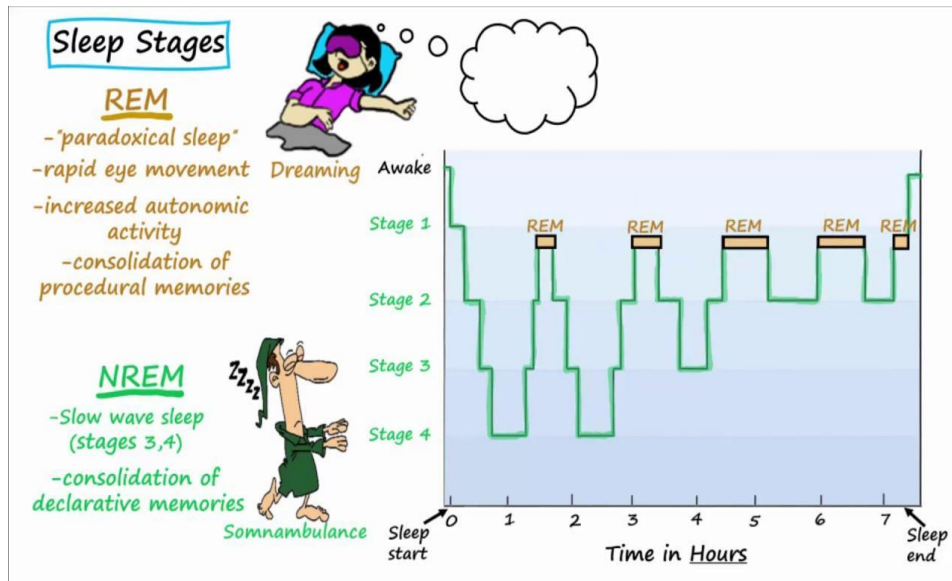
Despite their sometimes unsettling nature, dreams are a natural and necessary part of the sleep cycle. Most people experience dreams on a regular basis, and they can be a fascinating and illuminating aspect of the human experience. Whether they are a product of the brain's processing of memories or a window into the subconscious mind, dreams continue to captivate and intrigue us with their mysterious and often symbolic imagery.

NREM and REM

There are two main types of sleep: Rapid Eye Movement (REM) and Non-Rapid Eye Movement (NREM) sleep. These two sleep stages are distinct from each other and serve different purposes in the sleep cycle.

NREM Sleep:

NREM sleep is the first stage of sleep and typically lasts for about 70-90 minutes. During NREM sleep, the brain activity slows down, and the body begins to relax. NREM sleep is further divided into three stages: N1, N2, and N3.



<https://www.youtube.com/@physiopathopharmaco4190>

N1: This is the lightest stage of sleep, where the person is just beginning to fall asleep. The person may experience slow eye movements, reduced muscle tone, and a feeling of drifting in and out of consciousness. This stage typically lasts for about 5-10 minutes.

N2: This is the stage of sleep where the body temperature drops, and the heart rate and breathing become slower and more regular. The brain waves during this stage are slower and more synchronized, and the person becomes more deeply asleep. The person is still responsive to external stimuli but may experience sleep spindles and K-complexes.

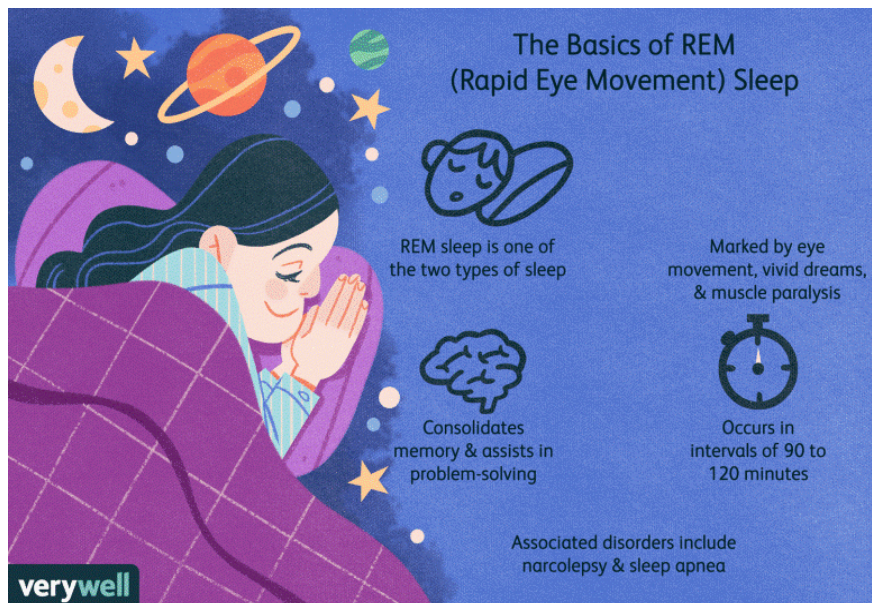
N3: This is the deepest stage of NREM sleep, also known as slow-wave sleep (SWS). The brain waves are slow and synchronized, and the person is in a state of deep relaxation. It is more difficult to wake up from this stage, and the person may feel groggy and disoriented if awakened abruptly. This stage is important for physical restoration and repair, and it is where the body produces growth hormones.

N4: The last NREM stage is stage 4, which lasts approximately 20 to 40 minutes in the first cycle and makes up about 10 to 15 percent of sleep. The arousal threshold is highest for all NREM stages in stage 4.

REM Sleep:

REM sleep is the stage of sleep where most dreaming occurs. It typically occurs after a period of NREM sleep, and it lasts for about 90-120 minutes. During REM sleep, the brain activity increases, and the eyes move rapidly back and forth under the eyelids, hence the name "Rapid Eye Movement." The body becomes temporarily paralyzed, with the exception of the diaphragm, which controls breathing.

REM sleep is essential for cognitive restoration and emotional regulation. It is during this stage that the brain processes and consolidates memories, enhances creativity, and regulates emotions. REM sleep is also important for maintaining a healthy mood, and a lack of REM sleep has been linked to depression and anxiety.



<https://www.verywellhealth.com/what-is-rem-sleep-5085353>

The Sleep Cycle:

The sleep cycle is the progression of sleep stages that occur throughout the night. On average, an adult goes through 4-5 sleep cycles per night, each lasting about 90-120 minutes. The sleep cycle typically begins with NREM sleep, followed by a brief period of REM sleep. As the night progresses, the REM sleep periods become longer, while the NREM sleep periods become shorter.

The amount of time spent in each sleep stage varies depending on age and other factors. Infants spend a larger proportion of their sleep time in REM sleep, while older adults spend more time in NREM sleep. The sleep cycle can also be influenced by external factors such as caffeine, alcohol, and medication.

In conclusion, NREM and REM sleep are distinct sleep stages that serve different purposes in the sleep cycle. NREM sleep is essential for physical restoration and repair, while REM sleep is important for cognitive restoration and emotional regulation. The sleep cycle is a progression of these stages that occurs throughout the night, and it is essential for maintaining good physical and mental health.

Dreaming as Overnight Therapy

Dreaming is a complex and fascinating phenomenon that occurs during sleep. For centuries, people have been fascinated by the nature of dreams, and many theories have been put forward to explain their purpose and significance. One theory that has gained prominence in recent years is that dreaming serves as overnight therapy, allowing us to process and cope with difficult emotions and experiences.

When we sleep, our brains enter a different state of consciousness, and our thoughts and feelings are processed differently than when we are awake. During this time, our brains are busy consolidating and integrating memories, processing emotional experiences, and preparing us for the challenges of the day ahead. Dreams are an important part of this process, providing us with a safe space to explore and process difficult emotions and experiences.

Research has shown that dreaming can help to reduce stress and anxiety, improve emotional regulation, and enhance overall psychological well-being. Dreams allow us to work through unresolved conflicts and emotions, and they provide a valuable opportunity for self-reflection and growth.

One way in which dreaming serves as overnight therapy is through the process of emotional regulation. During sleep, the amygdala, a key brain region involved in emotional processing, is less active than during wakefulness. This allows us to process emotional experiences without becoming overwhelmed by them, and it allows us to integrate emotional information into our long-term memory more effectively.

Another way in which dreaming serves as overnight therapy is through the process of memory consolidation. During sleep, the brain processes and consolidates memories, allowing us to retain important information and forget irrelevant details. This process is essential for learning and for the formation of long-term memories.

Dreams can also help us to process and cope with traumatic experiences. For people who have experienced trauma, nightmares can be a common symptom, but research has shown that these nightmares may actually serve a therapeutic purpose. By replaying and processing traumatic memories in a safe and

Dreaming is a complex and fascinating phenomenon that has puzzled scientists, philosophers, and ordinary people for centuries. While the exact purpose and mechanisms of dreaming are still not fully understood, recent research has shed light on the potential therapeutic benefits of dreaming.

One theory is that dreaming serves as a form of overnight therapy. During REM sleep, the brain processes and consolidates emotional memories, which can help to reduce the intensity of negative emotions and facilitate emotional healing. In other words, dreaming allows us to process and make sense of the events and experiences of our waking life, especially those that are emotionally charged or traumatic.

Research has shown that dreaming can be particularly beneficial for individuals who have experienced trauma or are struggling with emotional issues such as anxiety, depression, and PTSD. Studies have found that people who dream more frequently tend to have better emotional regulation and coping skills, as well as lower levels of stress and anxiety.

In addition, dreaming can provide a safe and controlled environment for exploring and working through emotional issues. Dreams often contain symbolic representations of our thoughts, feelings, and experiences, which can help us to process and integrate these experiences in a way that is less overwhelming than confronting them directly in waking life.

For example, a person who is struggling with feelings of anger or resentment towards someone may have a dream where they confront that person in a safe and controlled environment. This dream can provide an opportunity to express and process these emotions in a way that is not possible in waking life, leading to greater emotional understanding and healing.

Moreover, lucid dreaming, or the ability to become aware that one is dreaming while still in the dream, can be a powerful tool for overcoming fears and phobias. By recognizing that they are in a dream, the dreamer can practice facing and overcoming their fears in a safe and controlled environment, which can lead to greater confidence and resilience in waking life.

However, it is important to note that not all dreams are therapeutic or beneficial. Some dreams can be disturbing or traumatic, and repeated nightmares can be a sign of underlying psychological issues that may require professional help.

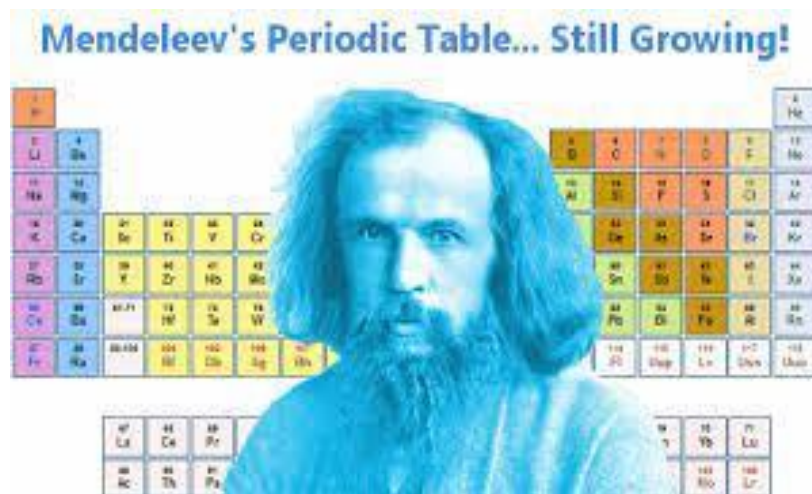
In conclusion, dreaming can serve as a powerful tool for emotional healing and personal growth. By providing a safe and controlled environment for exploring and processing emotional issues, dreaming can help individuals to better understand and cope with their emotions and experiences. While not all dreams are therapeutic, research suggests that frequent dreaming and lucid dreaming may be particularly beneficial for individuals who are struggling with emotional issues or have experienced trauma.

Dream and Creativity

Dreams have long been a source of inspiration and creativity for artists, writers, and musicians throughout history. From the surreal and otherworldly landscapes of Salvador Dali's paintings to the fantastical creatures of Lewis Carroll's Alice in Wonderland, dreams have sparked the imagination and provided a rich tapestry of ideas and images to draw from.



Mendeleev discovered Periodic table in dreams . He said “In a dream I saw a table where all the elements fell into place as required. Awakening, I immediately wrote it down on a piece of paper.”



One reason why dreams can be a powerful source of creativity is that they often tap into the subconscious mind. While our conscious mind is focused on the demands and distractions of our waking life, our subconscious mind is free to wander and explore the depths of our psyche. This can lead to a wealth of ideas and insights that may not be accessible in our waking state.

Dreams can also be a source of inspiration for overcoming creative blocks. When we are stuck on a creative problem, our conscious mind can become fixated on finding a solution, leading to a state of mental fatigue and frustration. However, by taking a break and allowing our mind to wander during sleep, our subconscious mind can continue to work on the problem and generate new ideas and perspectives.

Moreover, dreams can provide a rich source of symbolism and metaphor that can be used to explore and express complex emotional and psychological themes in creative work. By tapping into the archetypal imagery and themes of our dreams, artists and writers can create work that resonates with universal human experiences and emotions.

In addition, lucid dreaming, or the ability to become aware that one is dreaming while still in the dream, can be a powerful tool for exploring and experimenting with creative ideas. By recognizing that they are in a dream, the dreamer can consciously control and manipulate the dream environment, creating new worlds and experiences that can inspire and inform creative work.

However, it is important to note that not all dreams are creative or inspirational. Some dreams can be mundane or even disturbing, and repeated nightmares can be a sign of underlying psychological issues that may require professional help.

In conclusion, dreams can be a powerful source of inspiration and creativity for artists, writers, and musicians. By tapping into the subconscious mind and exploring the archetypal imagery and themes of our dreams, we can generate new ideas and perspectives that may not be accessible in our waking state. Lucid dreaming can be a particularly powerful tool for exploring and experimenting with creative ideas. However, it is important to approach dreams with a critical and discerning eye, as not all dreams are creative or beneficial, and some may require professional help to address underlying psychological issues.

Sleep is a vital part of our daily routine, allowing our bodies to rest and recharge for the next day. However, for many individuals, sleep can be elusive due to a variety of sleep disorders. Sleep disorders are conditions that affect the quality, timing, and amount of sleep, and can have a significant impact on daily functioning and overall health.

One of the most common sleep disorders is insomnia, which is characterized by difficulty falling asleep, staying asleep, or waking up too early. Insomnia can be caused by a variety of factors, including stress, anxiety, depression, chronic pain, and certain medications. Chronic insomnia can have a significant impact on daily functioning, leading to fatigue, irritability, and difficulty concentrating.

Another common sleep disorder is sleep apnea, which is a condition in which the individual's breathing is interrupted during sleep, leading to a drop in oxygen levels and arousals from sleep. Sleep apnea can be caused by a variety of factors, including obesity, alcohol use, and certain medical conditions. Left untreated, sleep apnea can lead to daytime fatigue, high blood pressure, and an increased risk of cardiovascular disease.

Restless leg syndrome (RLS) is another sleep disorder that affects a significant portion of the population, particularly older individuals. RLS is characterized by an urge to move the legs, often accompanied by uncomfortable sensations such as itching, crawling, or tingling. The symptoms of RLS are often worse at night, making it difficult to fall asleep and stay asleep.

Narcolepsy is a rare sleep disorder that is characterized by excessive daytime sleepiness and sudden episodes of falling asleep during the day, even in the middle of an activity.

Narcolepsy is caused by a dysfunction in the brain's sleep-wake cycle, and can have a significant impact on daily functioning and safety.

Another sleep disorder is parasomnia, which refers to abnormal behaviours or movements during sleep, such as sleepwalking, night terrors, and REM sleep behaviour disorder. These conditions can be dangerous, particularly for individuals who engage in complex behaviors during sleep, such as driving or cooking.

In addition to these disorders, there are several other sleep disorders that can affect individuals, including circadian rhythm disorders, shift work sleep disorder, and bruxism (teeth grinding).

Treatment for sleep disorders varies depending on the specific condition and severity of symptoms. For insomnia, cognitive-behavioral therapy (CBT) and medication can be effective. For sleep apnea, continuous positive airway pressure (CPAP) machines are often used to keep the airway open during sleep. For RLS, medications that increase dopamine levels in the brain can be effective. Narcolepsy is often treated with medications that stimulate the central nervous system.

In conclusion, sleep disorders are a common and often debilitating condition that can have a significant impact on daily functioning and overall health. While treatment options are available, it is important for individuals who are experiencing symptoms of a sleep disorder to seek professional help in order to receive an accurate diagnosis and appropriate treatment. With proper treatment, individuals can experience improved sleep quality and overall well-being.

Sleep and Society

Sleep is an essential part of our daily routine, yet it is often undervalued and overlooked in our society. The demands of work, school, and social life often prioritize productivity and activity over rest and recovery, leading to a culture of sleep deprivation and fatigue.

One of the biggest contributors to sleep deprivation in our society is the prevalence of technology, particularly smartphones and other mobile devices. The blue light emitted by these devices can disrupt our natural sleep-wake cycle, making it harder to fall asleep and stay asleep. In addition, the constant stream of notifications and messages can create a sense of urgency and pressure to stay connected, even at the expense of sleep.

Another factor contributing to sleep deprivation is the pressure to work longer hours and achieve more in less time. This can lead to a culture of overwork, with many individuals sacrificing sleep in order to meet work deadlines or attend social events. The resulting fatigue and burnout can have significant negative impacts on both physical and mental health.

In addition to the impact on individuals, sleep deprivation can also have a significant impact on society as a whole. For example, drowsy driving is a major safety concern, with studies showing that fatigue can impair driving ability as much as alcohol. In addition, sleep deprivation can contribute to a variety of health problems, including obesity, diabetes, and cardiovascular disease, all of which can place a significant burden on healthcare systems and the economy.

Despite these challenges, there is a growing awareness of the importance of sleep in our society. Many companies are implementing policies to support employee well-being and encourage healthy sleep habits, such as flexible work hours and designated quiet spaces for rest and relaxation. Schools are also recognizing the importance of sleep for academic performance and are implementing later start times to better align with adolescents' natural sleep patterns.

There is also a growing movement towards prioritizing self-care and mental health, with many individuals recognizing the importance of rest and recovery in maintaining overall well-being. This includes practices such as mindfulness, meditation, and yoga, which can help to reduce stress and promote relaxation, making it easier to fall asleep and stay asleep.

In conclusion, sleep is a vital component of our daily lives, yet it is often undervalued and overlooked in our society. The demands of work, school, and social life can create a culture of sleep deprivation and fatigue, which can have significant negative impacts on both individuals and society as a whole. However, there is a growing awareness of the importance of sleep, and many individuals, companies, and schools are taking steps to prioritize healthy sleep habits and promote overall well-being. By recognizing the importance of rest and recovery, we can create a society that values and supports healthy sleep habits for all.

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How much sleep we need?

The amount of sleep that individuals need can vary depending on various factors such as age, lifestyle, genetics, and health conditions. However, the US National Sleep Foundation recommends the following guidelines for daily sleep duration:

Newborns (0-3 months): 14-17 hours

Infants (4-11 months): 12-15 hours

Toddlers (1-2 years): 11-14 hours

Preschoolers (3-5 years): 10-13 hours

School-aged children (6-13 years): 9-11 hours

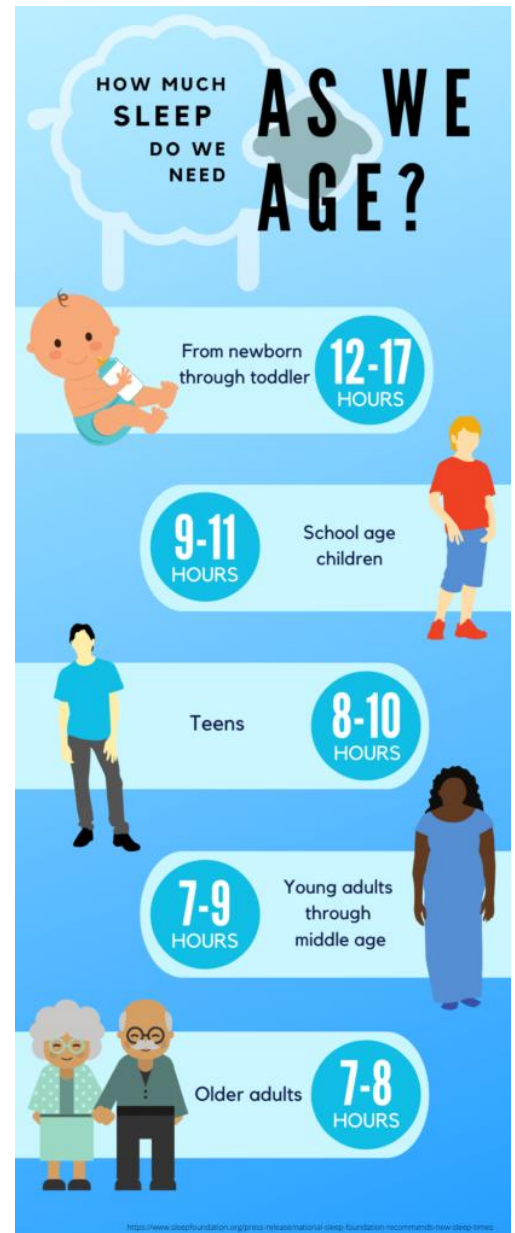
Teenagers (14-17 years): 8-10 hours

Adults (18-64 years): 7-9 hours

Older adults (65 years and above): 7-8 hours

It's worth noting that the above recommendations are just general guidelines and some people may require more or less sleep to function optimally. It's important to listen to your body and establish a sleep routine that works best for you.

<https://ampmbilling.com/how-much-sleeping-need-age/>





Co-funded by
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SWIMMING AND NUTRITION AS
TOOLS FOR CONTAINING HEALTH

Tips for healthy sleep

Getting a good night's sleep is essential for overall health and well-being. However, with the demands of modern life, it can be challenging to establish healthy sleep habits. Here are some tips for promoting healthy sleep:

Stick to a regular sleep schedule: Try to go to bed and wake up at the same time every day, even on weekends. This helps to regulate your body's natural sleep-wake cycle.

Create a relaxing bedtime routine: Establish a calming routine before bed to signal to your body that it's time to sleep. This could include reading a book, taking a bath, or practicing relaxation techniques like meditation or deep breathing.

Make your bedroom conducive to sleep: Keep your bedroom cool, quiet, and dark to create a comfortable sleeping environment. Avoid using electronic devices in the bedroom, and consider investing in a comfortable mattress and pillows.

Limit caffeine and alcohol: Caffeine is a stimulant that can interfere with sleep, so it's best to avoid it in the hours leading up to bedtime. While alcohol can make you feel sleepy, it can also disrupt the quality of your sleep, so it's best to limit alcohol intake.

Exercise regularly: Regular physical activity can help promote healthy sleep. However, try to avoid exercising too close to bedtime, as this can interfere with sleep.

Limit screen time: The blue light emitted by electronic devices can interfere with your body's natural sleep-wake cycle. Try to limit screen time in the hours leading up to bedtime, and consider using a blue light filter on your devices.

Manage stress: Stress and anxiety can make it difficult to fall asleep and stay asleep. Try to manage stress through relaxation techniques like meditation, deep breathing, or yoga.



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By incorporating these tips into your daily routine, you can promote healthy sleep habits and improve the quality of your sleep. If you continue to struggle with sleep despite making these changes, consider talking to a healthcare professional, as there may be an underlying sleep disorder that needs to be addressed.

Sources:

M. Walker (2017). *Why we sleep*. Scribner.

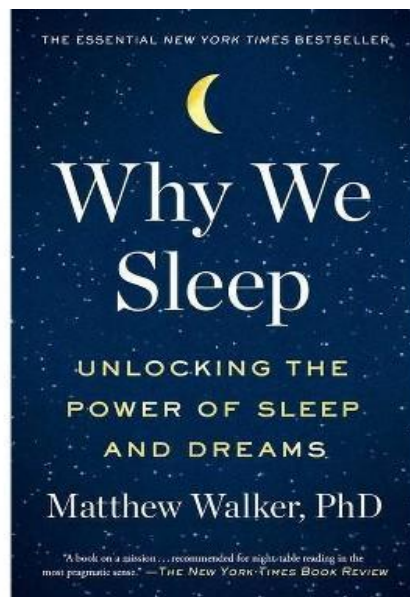
Matthew Walker's book "Why We Sleep" is a fascinating and informative read on the importance of sleep.[13] Walker is a professor of neuroscience and psychology at the University of California, Berkeley, and his expertise in the field is evident throughout the book.

One of the most compelling aspects of the book is the way Walker explains the many benefits of sleep for our physical and mental health. He covers everything from memory consolidation and emotional regulation to the prevention of Alzheimer's disease and cancer. By presenting research in an accessible and engaging way, he makes a compelling case for why sleep should be a top priority for everyone.

In addition to explaining the benefits of sleep, Walker also covers the negative consequences of sleep deprivation. He explores the impact of sleep deprivation on our mood, cognitive function,

and physical health. The examples and studies he cites are often shocking and serve as a wake-up call for readers who may not have realized the extent to which lack of sleep can harm us.

"Why We Sleep" is a well-researched and engaging book that makes a strong case for the importance of sleep. Walker's writing is accessible and entertaining, and his expertise in the field shines through. Anyone interested in improving their health and well-being should read this book.



While "Why We Sleep" by Matthew Walker has received widespread praise for its informative and accessible approach to the importance of sleep, there are also some criticisms of the book that are worth considering.

One criticism of the book is that it oversimplifies the relationship between sleep and health. While Walker does make a compelling case for the many benefits of sleep, some critics argue that he may be overstating the negative consequences of sleep deprivation or overlooking the complexity of the relationship between sleep and health.

Another criticism is that the book may be too alarmist in its tone, which could lead some readers to become overly anxious about their sleep habits. While Walker does emphasize the importance of prioritizing sleep and avoiding common sleep disruptors, some readers may find

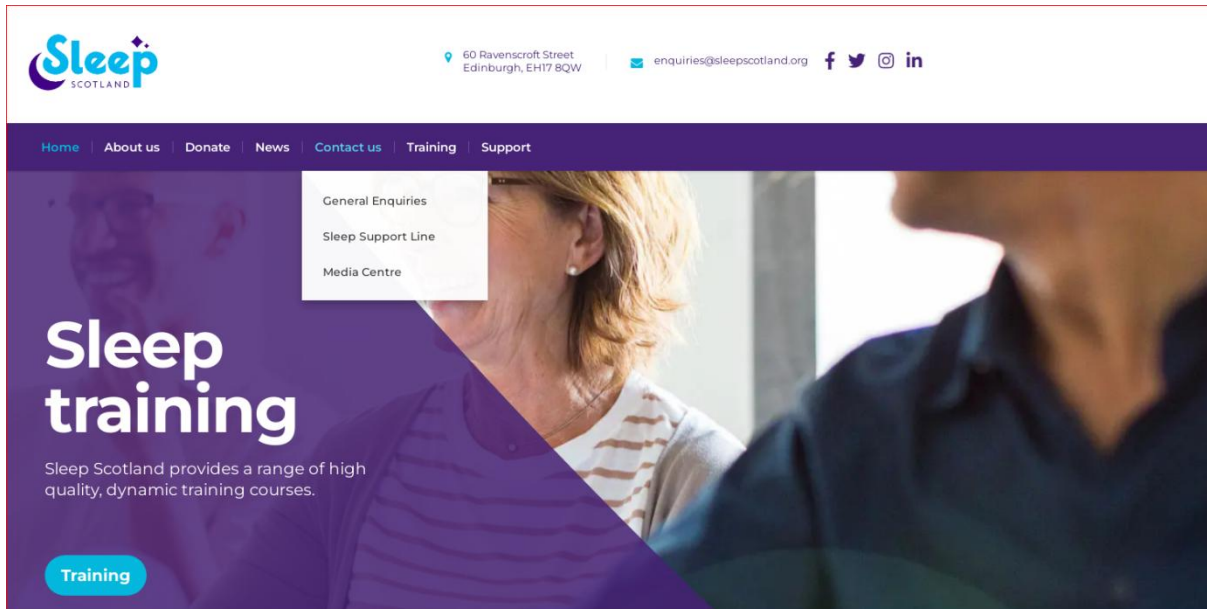
the book's emphasis on the potential negative consequences of poor sleep to be overly stressful.

Additionally, some readers have pointed out that the book focuses primarily on the scientific evidence for the importance of sleep, while giving relatively little attention to practical tips or strategies for improving sleep habits. While Walker does offer some general recommendations for improving sleep hygiene, some readers may have been hoping for more specific and actionable advice.

Overall, while "Why We Sleep" has been widely praised for its engaging and informative approach to the importance of sleep, it is important to consider the criticisms of the book as well. Nonetheless, the book remains an important contribution to the field, and may ultimately help readers better understand and prioritize the role of sleep in their overall health and well-being.

There is interesting Hubermas podcast with Walker on <https://www.youtube.com/watch?v=gbQFSMayJxk>.

2. <https://sleepscotland.org/>



Sleep Scotland is a charity organization that aims to improve the quality of life for children and young people with sleep problems.^[11] The organization provides a range of services to families and professionals, including assessment, diagnosis, and treatment of sleep problems.

The Sleep Scotland website provides information on sleep problems in children and young people, including common sleep disorders, signs and symptoms of sleep problems, and tips for promoting good sleep hygiene.

Here are M. Walkman tips for sleeping:

1. Stick to a sleep schedule. Go to bed and wake up at the same time each day. As creatures of habit, people have a hard time adjusting to changes in sleep patterns. Sleeping later on weekends won't fully make up for a lack of sleep during the week and will make it harder to wake up early on Monday morning. Set an alarm for bedtime. Often we set an alarm for when it's time to wake up but fail to do so for when it's time to go to sleep. If there is only one piece of advice you remember and take from these twelve tips, this should be it.

2. Exercise is great, but not too late in the day. Try to exercise at least thirty minutes on most days but not later than two to three hours before your bedtime.
3. Avoid caffeine and nicotine. Coffee, colas, certain teas, and chocolate contain the stimulant caffeine, and its effects can take as long as eight hours to wear off fully. therefore, a cup of coffee in the late afternoon can make it hard for you to fall asleep at night. Nicotine is also a stimulant, often causing smokers to sleep only very lightly. In addition, smokers often wake up too early in the morning because of nicotine withdrawal.
4. Avoid alcoholic drinks before bed. Having a nightcap or alcoholi beverage before sleep may help you relax, but heavy use robs you of REM sleep, keeping you in the lighter stages of sleep. Heavy alcohol ingestion also may contribute to impairment in breathing at night. You also tend to wake up in the middle of the night when the effects of the alcohol have worn off.
5. Avoid large meals and beverages late at night. A light snack is okay, but a large meal can cause indigestion, which interferes with sleep. Drinking too many fluids at night can cause frequent awakenings to urinate.
6. If possible, avoid medicines that delay or disrupt your sleep. Some commonly prescribed heart, blood pressure, or asthma medications, a well as some over-the-counter and herbal remedies for coughs, colds, or allergies, can disrupt sleep patterns. If you have trouble sleeping, talk to your health care provider or pharmacist to see whether any drugs you're taking might be contributing to your insomnia and ask whether they can be taken at other times during the day or early in the evening.
7. Don't take naps after 3 p.m. Naps can help make up for lost sleep, but late afternoon naps can make it harder to fall asleep at night.
8. Relax before bed. Don't overschedule your day so that no time is left for unwinding. A relaxing activity, such as reading or listening to music, should be part of your bedtime ritual.
9. Take a hot bath before bed. The drop in body temperature after getting out of the bath may help you feel sleepy, and the bath can help you relax and slow down so you're more ready to sleep.
10. Dark bedroom, cool bedroom, gadget-free bedroom. Get rid of anything in your bedroom that might distract you from sleep, such as noises, bright lights, an uncomfortable bed,

or warm temperatures. You sleep better if the temperature in the room is kept on the cool side. A TV, cell phone, or computer in the bedroom can be a distraction and deprive you of needed sleep. Having a comfortable mattress and pillow can help promote a good night's sleep. Individuals who have insomnia often watch the clock. Turn the clock's face out of view so you don't worry about the time while trying to fall asleep.

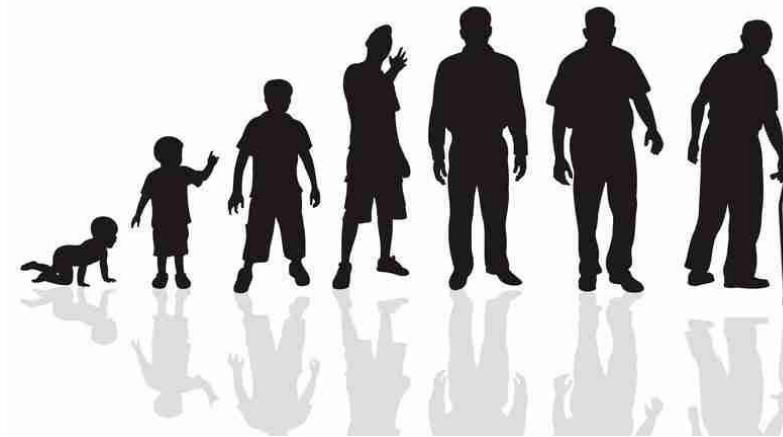
11. Have the right sunlight exposure. Daylight is key to regulating daily sleep patterns. Try to get outside in natural sunlight for at least thirty minutes each day. If possible, wake up with the sun or use very bright lights in the morning. Sleep experts recommend that, if you have problems falling asleep, you should get an hour of exposure to morning sunlight and turn down the lights before bedtime.
12. Don't lie in bed awake. If you find yourself still awake after staying in bed for more than twenty minutes or if you are starting to feel anxious or worried, get up and do some relaxing activity until you feel sleepy. The anxiety of not being able to sleep can make it harder to fall asleep

Ageing

"Anyone who keeps the ability to see beauty never grows old."

- Franz Kafka

Aging is a natural and inevitable process that affects all living organisms, including humans. While aging is a complex process that can be influenced by a range of factors, there are several key biological and environmental factors that contribute to the aging process.



<https://pilates-bodytehnika-zagreb.com.hr/krizna-razdoblja-u-zivotu/>

One of the key factors that contribute to aging is genetics. The genes we inherit from our parents play a significant role in determining how we age. For example, some people may be genetically predisposed to age more rapidly than others.

Another factor that contributes to aging is cellular damage. Over time, the cells in our bodies accumulate damage from exposure to environmental factors such as toxins, radiation, and pollutants. This damage can lead to cellular dysfunction, inflammation, and oxidative stress, which can contribute to the aging process.

Additionally, the decline in hormone levels as we age can also contribute to the aging process. Hormones such as estrogen, testosterone, and growth hormone play important roles in maintaining the health and function of our bodies. As these hormone levels decline with age, we may experience a range of physical and mental changes, including decreased bone density, decreased muscle mass, and cognitive decline.

Finally, lifestyle factors such as diet, exercise, and stress can also contribute to the aging process. Poor dietary habits, lack of exercise, and chronic stress can all contribute to cellular damage, inflammation, and oxidative stress, which can accelerate the aging process.

While aging is a natural and inevitable process, there are steps we can take to promote healthy aging. This includes adopting a healthy diet and exercise routine, reducing stress, and avoiding exposure to environmental toxins and pollutants. Additionally, some scientists are exploring ways to slow down the aging process through interventions such as calorie restriction and genetic manipulation. While these interventions are still in the early stages of research, they hold promise for improving the quality of life for people as they age.

Aging is a natural and inevitable process that affects all living organisms, including humans. While we cannot stop the aging process, there are steps we can take to slow down the aging process and maintain our health and vitality as we age.

Healthy aging is a goal that many people strive for as they enter their later years. While aging is a natural process, there are steps that you can take to promote healthy aging and maintain your physical and mental health. Here are some tips for healthy aging:

Exercise regularly: Exercise has been shown to have numerous health benefits, including reducing the risk of chronic diseases, improving mental health, and enhancing physical function. Regular exercise can also help to slow down the aging process by reducing cellular damage, inflammation, and oxidative stress.



<https://www.milestoneretirement.com/senior-living/ok/stillwater/the-renaissance-of-stillwater/>

Eat a healthy diet: A healthy diet is essential for maintaining good health and preventing chronic diseases. Eating a diet rich in fruits, vegetables, whole grains, and lean proteins can provide the essential nutrients your body needs to function properly and support healthy aging.

Get enough sleep: Sleep is essential for physical and mental health, and getting enough sleep can help to slow down the aging process. Aim for 7-9 hours of sleep per night, and establish a regular sleep routine to help improve sleep quality.

Manage stress: Chronic stress can contribute to cellular damage, inflammation, and oxidative stress, which can accelerate the aging process. Managing stress through practices such as meditation, deep breathing, or yoga can help to reduce stress and slow down the aging process.

Avoid smoking and excessive alcohol consumption: Smoking and excessive alcohol consumption can contribute to cellular damage, inflammation, and oxidative stress, which can accelerate the aging process. Avoiding these behaviors can help to slow down the aging process and promote good health.



Protect your skin from the sun: Exposure to UV radiation from the sun can cause skin damage, premature aging, and increase the risk of skin cancer. Protect your skin from the sun by wearing protective clothing, using sunscreen, and avoiding the sun during peak hours.



Stay socially connected: Social isolation and loneliness have been linked to poor health outcomes and accelerated aging. Staying socially connected through social activities, hobbies, and spending time with loved ones can help to slow down the aging process and improve overall health and wellbeing.



Consider anti-aging supplements: There are a range of supplements that are marketed as anti-aging supplements, including vitamins, minerals, and antioxidants. While the efficacy of these supplements in slowing down the aging process is still being studied, some studies suggest that certain supplements may have beneficial effects on aging and age-related diseases.

Consider hormone replacement therapy: Hormone levels decline with age, and hormone replacement therapy may be an option for individuals experiencing symptoms of hormonal imbalances, such as decreased bone density, decreased muscle mass, and cognitive decline.

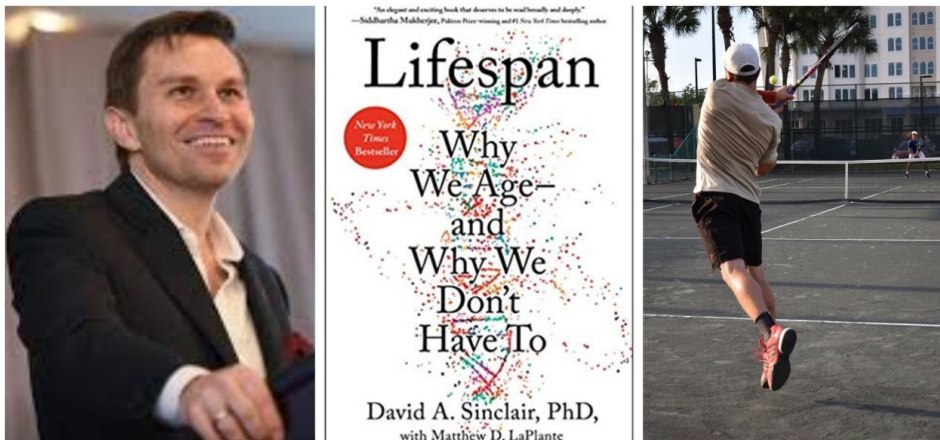
In conclusion, aging is a natural and inevitable process, but there are steps we can take to slow down the aging process and maintain our health and vitality as we age. Adopting a healthy lifestyle, managing stress, staying socially connected, and considering supplements and hormone replacement therapy may all help to slow down the aging process and promote healthy aging.

Sources:

Lifespan: Why We Age, and Why We Don't Have To.

The book *"Lifespan: Why We Age, and Why We Don't Have To"* by David A. Sinclair is a comprehensive and accessible overview of the science of aging and the cutting-edge research being conducted in the field. Sinclair is a renowned scientist and professor of genetics at Harvard Medical School, and his expertise and passion for the subject are evident throughout the book.

One of the most compelling aspects of the book is Sinclair's exploration of the various factors that contribute to aging, from genetic and cellular mechanisms to environmental and lifestyle factors. He provides a clear and accessible overview of the latest research in the field, and his writing is engaging and thought-provoking.



In addition to explaining the various mechanisms of aging, Sinclair also explores the potential interventions that may help slow or even reverse the aging process. He discusses the benefits of

caloric restriction, exercise, and various drugs and supplements, and provides compelling evidence that these interventions can have a significant impact on lifespan and healthspan.

Overall, "Lifespan" is a fascinating and informative read that provides a comprehensive overview of the science of aging. Sinclair's writing is engaging and accessible, and his enthusiasm for the subject is infectious. Anyone interested in the science of aging and longevity should read this book. It is an important contribution to the field, and may ultimately help us all live longer, healthier lives.

While "Lifespan: Why We Age, and Why We Don't Have To" by David A. Sinclair has received widespread praise for its informative and engaging approach to the science of aging, there are also some criticisms of the book that are worth considering.

One criticism of the book is that it presents an overly optimistic view of the potential for interventions to slow or even reverse the aging process. While Sinclair does acknowledge that much of the research in the field is still in the early stages and that many interventions have yet to be proven effective in humans, some critics argue that he may be overselling the potential benefits of these interventions.

Another criticism is that the book may be too technical for some readers, particularly those without a background in biology or genetics. While Sinclair does make an effort to explain complex concepts in an accessible way, some readers may still find certain sections of the book difficult to follow.

Additionally, some readers have expressed concern that the book promotes a "miracle cure" mentality that could lead people to take unnecessary risks or neglect other important aspects of their health. While Sinclair does emphasize the potential benefits of various interventions, he also stresses the importance of a healthy lifestyle, including a balanced diet and regular exercise.

Overall, while "Lifespan" has been widely praised for its informative and engaging approach to the science of aging, it is important to consider the criticisms of the book as well. Nonetheless, the book remains an important contribution to the field, and may ultimately help us all live longer, healthier lives.

There is a podcast with Sinclair.

<https://www.youtube.com/watch?v=X1kLizzdb2c>

More you can find here <https://www.lifespanpodcast.com/>

Here is description what Sinclair to do to slow down ageing:

»And so, with all that on the table, what do I do?

- I take 1 gram (1,000 mg) of NMN every morning, along with 1 gram of resveratrol (shaken into my homemade yogurt) and 1 gram of metformin.
- I take a daily dose of vitamin D, vitamin K2, and 83 mg of aspirin.
- I strive to keep my sugar, bread, and pasta intake as low as possible. I gave up desserts at age 40, though I do steal tastes.
- I try to skip one meal a day or at least make it really small. My busy schedule almost always means that I miss lunch most days of the week.
- Every few months, a phlebotomist comes to my home to draw my blood, which I have analyzed for dozens of biomarkers. When my levels of various markers are not optimal, I moderate them with food or exercise.
- I try to take a lot of steps each day and walk upstairs, and I go to the gym most weekends with my son, Ben; we lift weights, jog a bit, and hang out in the sauna before dunking in an ice-cold pool.
- I eat a lot of plants and try to avoid eating other mammals, even though they do taste good. If I work out, I will eat meat.
- I don't smoke. I try to avoid microwaved plastic, excessive UV exposure, X-rays, and CT scans.
- I try to stay on the cool side during the day and when I sleep at night.
- I aim to keep my body weight or BMI in the optimal range for healthspan, which for me is 23 to 2.«



Co-funded by
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